ODISHA ELECTRICITY REGULATORY COMMISSION

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PUBLIC NOTICE

Sub: Previous publication of Odisha Grid Code (OGC) Regulations, 2014.

The Commission had framed the Orissa Grid Code (OGC) Regulations, 2006, in line with the IEGC-2006 which were published in the Orissa Gazette, Extra-ordinary No.819 dt.14th June, 2006. The said Regulations had been amended from time to time. In the meanwhile, the new IEGC, 2010 has been framed by CERC, which have come into force with effect from 3rd May 2010 and subsequently have been amended two times on 5th March, 2012 and 6th January, 2014. Resultantly there has also been significant changes in the amended IEGC 2010 with respect to IEGC 2006. Hence, it is necessary to frame new version of OGC in line with IEGC 2010. A fresh modified version of OGC Regulations have been prepared making it suitable for application in the State of Odisha.

Accordingly, the Commission hereby publish the Odisha Grid Code (OGC) Regulations, 2014 for information of the general public.

The proposed Odisha Grid Code Regulations are available in the Commission's website: www.orierc.org. The copies of the Odisha Grid Code may also be obtained from the Commission's office by payment of necessary fees.

Before finalization of the Odisha Grid Code Regulations, 2014, the Commission invite opinion through this previous publication u/s 181(3) of the Electricity Act, 2003. Interested persons/institutions/associations may furnish their suggestions/opinions on the said Regulations to the undersigned within 30 days of publication of this notice. On receipt of the responses from different quarters, the Commission may, in appropriate cases, bring the modifications, if any, to the proposed Odisha Grid Code Regulations and approve the same for publication in the official gazette.

By order of the Commission
Sd/-
(G.K.Dhall)
Secretary

ODISHA ELECTRICITY REGULATORY COMMISSION
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ODISHA GRID CODE (OGC) REGULATIONS 2014

No. Engg. 17/2005-(Vol. VII) - In exercise of the powers conferred by Sub-Section (zp) of Section 181(2)read with Sub-Section (h) of Section 86 (1) of the Act (36 of 2003), the Odisha Electricity Regulatory Commission hereby makes the following Regulations, namely:-

1. Short title, extent and commencement

(a) These Regulations may be called the Odisha Grid Code, Regulation 2014, in short 'OGC'.

(b) These Regulations shall extend to the whole of the State of Orissa and for all Users who are connected with and / or utilise the State Transmission System including the Transmission Licensee(s).

(c) These Regulations shall come into force from the date of their publication in the Official Gazette**.**

2. Definitions

(a) In these Regulations unless the context otherwise requires, words or expressions used herein have the meanings assigned to them as defined at Section 1.19 (in Chapter 1) of these Regulations.

(b) In these Regulations, words or expressions used herein and not defined at section 1.19 (in Chapter 1), have the meanings assigned to them under the Act and the meanings commonly understood in Electrical Engineering.

CHAPTER-1

GENERAL

1.1 INTRODUCTION

Section 86(1)(h) of the Act requires the Odisha Electricity Regulatory Commission to specify a State Grid Code consistent with the provisions of Indian Electricity Grid Code prepared under Section 79(1)(h) of the Act and effective from 3rd May, 2010.

1.2 OBJECTIVE

The Odisha Grid Code (OGC) is a document that governs the boundary between the Transmission Licensee and other Users and establishes procedures for operations of facilities, which use the State Transmission System. It lays down both the information requirements and the procedures governing the relationship between various Users of State Transmission System as well as the State Load Despatch Centre. It should be noted that the OGC is not concerned with the detailed design and operation of generators, Power Stations, suppliers and Distribution Systems, provided that their overall compatibility with the Transmission System needs are assured.

The Transmission Licence requires that the Transmission Licensee in implementing and complying with the OGC shall neither discriminate against nor unduly prefer any one or any group of Users.

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

The OGC shall provide facilitation for beneficial trading of electricity by defining a common basis of operation of the State Transmission System (STS), applicable to all the Users of the STS.

The OGC shall also provide facilitation for the development of renewable energy sources by specifying the technical and commercial aspects for integration of these resources into the grid.

1.3 SCOPE

(1) The OGC shall be complied with by the Orissa Power Transmission Corporation Limited (OPTCL) in its capacity as a State Transmission Utility and holder of the Transmission Licence, Grid Corporation of Orissa Limited (GRIDCO) in its capacity of a trader/ bulk supplier, by generators, Central generating stations in capacity of injectors**,** other Transmission Licensees, other trading licensees, distribution licensees, suppliers and Bulk Power Consumers and Open Access Customers in the course of their generation, supply, utilisation of electricity and facilitation for beneficial trading of electricity.

(2) All persons (or) Utilities that connect with and / or utilise the State Transmission System (STS) of Orissa are required to abide by the principles and procedures defined in the OGC so far as they apply to that Utility.

The matters relating to State Transmission System (STS) and interstate Transmission System (ISTS) as provided in IEGC and its revisions shall be binding on the Users.

1.4 STRUCTURE OF THE OGC

This OGC contains the following Chapters:

(1) **General:**
This Chapter describes general features of OGC including definitions.

(2) **Role of various organisations**:

This chapter defines the functions of the various organisations as are relevant to OGC.

(3) **Planning Code for STS:**

This Chapter specifies the technical and design criteria and procedures to be followed by the State transmission utility (STU) i.e. OPTCL in planning and development of the State Transmission System and by other Users connected or seeking connection to the Transmission System. This Chapter provides the policy to be adopted in the planning and development of bulk power transfer and associated State Transmission System. The Planning Code lays out the detailed information exchange required between the planning Agencies and the various participants of the Power System for load forecasting, generation availability, and Power System planning etc. for the future years under study. The Planning Code stipulates the various criteria to be adopted during the planning process

(4) **Connection Conditions:**

This Chapter specifies the technical and design criteria and standards to be complied with by the Transmission Licensee and other Users connected or seeking Connection to the Transmission System, to maintain uniformity and quality across the system. This includes:

(a) Procedure for connection to the State Transmission System,
(b) Site responsibility schedule
(c) Connection Agreement

(5) **Operating Code for State Grid:**

This Chapter specifies the conditions under which the Transmission Licensee shall operate the Transmission System and other Users of the Transmission System shall operate their plant and/or systems for the generation and distribution of electricity in so far as necessary to protect the security and quality of supply and safe operation of the Transmission Licensee's Transmission System under both normal and abnormal operating conditions.

(a) Operating Policy

This Operating Policy describes the operational philosophy to maintain efficient, secure and reliable grid operation and contains the following aspects / Sections.

(i) System Security Aspects

This Section describes the general security aspects to be followed by generating companies and all Users of the grid.

(ii) Frequency and Voltage Management

This Section describes the method by which all Users of the Transmission System shall co-operate with the State Load Despatch Centre (SLDC) for effective control of the system frequency and managing the voltage of the Transmission System.

(iii) Demand Estimation for Operational Purposes

This Section details with the procedures to estimate the demand by the various Beneficiaries for their systems for the day / week / month / year ahead, which shall be used for operational planning.

(iv) Demand Management

This Section identifies the methodology to be adopted for demand control by each Beneficiary as a function of the frequency and deficit generation.

(v) Periodic Reports

This Section provides various provisions for reporting of the operating parameters of the grid such as frequency, Voltage profile etc.

(vi) Operational Liaison

This Section sets out the requirement for the exchange of information in relation to normal operation and/or events in the grid.

(vii) Outage Planning

This Section contains procedure for outage planning relating to co-ordination of the outages for scheduled maintenance of the Transmission System, Generating Unit and Distribution System that will use the Transmission System.

(viii) Recovery Procedures

This Section sets out the procedures to be adopted following a major grid disturbance, for Black Start and resynchronisation of islands, etc.

(ix) Operational Event/Accident Reporting

This Section states the procedure by which events are reported and the information exchange etc. takes place.

(6) **Scheduling & Despatch Code:**

This Chapter specifies the procedure to be adopted for scheduling and despatch of generation of the Generating companies, CGPs, renewable sources of generators, especially wind, solar and other transactions through long-term access, medium-term and short-term open access including complementary commercial mechanisms, on a day-ahead basis with the modality of the flow of information between the Generating companies and SLDC.

Most of the wind and solar energy sources are presently connected and in future are likely to be connected to the STU or the State's distribution utility. However, keeping in view the variable nature of generation from such sources and the effect such variability has on the state grid, and in view of the large-scale integration of such sources into the grid envisaged in view of the Government of India's thrust on renewable sources of energy, scheduling of wind and solar energy sources has been incorporated in this Code.

(7) **Monitoring of Generation and Drawal:**

This Chapter specifies responsibilities of all Users in the monitoring of Generating Unit reliability and performance and SLDC's compliance with the scheduled drawal and injection.

(8) **Cross Boundary Safety:**

This Chapter specifies safety when working across a control boundary.

(9) **Protection:**

This Chapter specifies the co-ordination responsibility and minimum standards of protection that are required to be installed by Users of the Transmission System.

(10) **Metering, Communication and Data Acquisition**:

This Chapter specifies the minimum operational and commercial metering to meet the regulatory requirement.

(11) **Management of OGC**

This Chapter specifies the procedure for review/amendment and management of OGC.

(12) **Data Registration:**

This Chapter specifies list of all data required to be provided by Users to the SLDC/Transmission Licensee and vice versa.

(13) **Miscellaneous:**

This Chapter specifies about issue of Orders and Practice Directions, power to amend this OGC, saving the inherent power of the Commission and power to remove difficulties.

1.5 INTERPRETATION

The meaning of certain terms used in the OGC shall be in accordance with the definitions listed in Section 1.19 "Definitions", of the OGC.

Words, terms and expressions occurring in this OGC and not defined herein shall bear the same meaning as in the Act and IEGC. Besides, Section 1.19 of this code has been developed on the premise that accepted engineering terms are as commonly understood in electricity industry.

The term "OGC" means any or all parts of these Regulations.

1.6 FREE GOVERNOR MODE OF OPERATION

(1) All thermal and hydro (except with zero pondage) Generating Units: with effect from the date to be separately notified by CERC.

(2) Any exemption from the above may be granted only by CERC for which the concerned User / Agency shall file a petition in advance.

1.7 CHARGE/PAYMENT FOR REACTIVE ENERGY EXCHANGES

The rate for charge/payment of reactive energy exchanges shall be as per the order issued by the Commission for time to time. This is now provisionally 6.5 paise per KVArh for the FY 2013-14.

1.8 EXEMPTIONS

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

1.9 IMPLEMENTATION AND OPERATION OF THE OGC

The STU / SLDC have the duty to implement the OGC. All Users are required to comply with the OGC. Users must provide the STU reasonable rights of access, service and facilities necessary to discharge its responsibilities in the Users' premises and to comply with instructions issued by the STU / SLDC, reasonably required to implement and enforce the OGC.

1.10 GENERAL REQUIREMENTS / LIMITATIONS OF OGC

The OGC contains procedures to permit equitable management of day-to-day technical situations in the Electricity Supply System (Grid), taking into account a wide range of operational conditions likely to be encountered under both normal and abnormal circumstances

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

1.11 CODAL RESPONSIBILITIES

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

1.12 CONFIDENTIALITY

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

1.13 PROCEDURES TO SETTLE DISPUTE

In the event of any dispute regarding interpretation of any part of the OGC provision between any User and the STU / SLDC, the matter may be referred to the Commission for its decision. The Commission's decision shall be final and binding.

In the event of any conflict between any provision of the OGC and any contract or agreement between the Users, the provision of the OGC shall prevail.

1.14 COMMUNICATION BETWEEN USERS

All communications between the STU and Users shall be in accordance with the provisions of the relevant provision of the OGC.

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

1.15 PARTIAL INVALIDITY

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

1.16 DIRECTIVE

The State Government may issue policy directives in certain matters consistent with the provisions of the Act, which the State Load Despatch Centre / Transmission Licensee shall promptly inform the Commission and all Users of the requirement of such direction. The directions will be complied with by the Users subject to Section 108 read with Section 37 of the Act

1.17 REVIEW

The Commission shall continue to review the OGC to make it compatible with the IEGC In the event of any inconsistencies; the provisions of IEGC shall prevail.

1.18 NON-COMPLIANCE

1. In case of a persistent non-compliance of any of the stipulations of the OGC by any User /Beneficiary (other than STU and SLDC), the matter shall be reported by any User /

Beneficiary to the Member Secretary of the Grid Co-ordination Committee (GCC). The Member Secretary of the GCC shall verify and take up the matter with the defaulting User / Beneficiary for expeditious termination of the non-compliance. In case of inadequate response to the efforts made by Member Secretary of the GCC the non-compliance shall be reported to the Commission. The Commission, in turn after due process, may order the defaulting User / Beneficiary for compliance, failing which; the Commission may take appropriate action.

2. In case of non-compliance of any of the stipulations of the OGC by SLDC, the matter shall be reported to the Commission.
3. Contravention of any of the provision(s) of this OGC or direction of the Commission as stipulated above may be dealt with Section 142 of the Act.
4. Notwithstanding anything contained in these regulations, the Commission, may also take suo-motu action against any person/utility, in case of non-compliance of any of the provisions of the IEGC/OGC.

1.19 **DEFINITIONS**

Word	Meaning
(1) ABT Users	Such Users like Distribution Licensees, Trading Licensees, Generators, Open Access Customers, EHT consumers and HT consumers having Contract demand of 5MVA or more to whom Availability Based Tariff is applicable.
(2) Act	The Electricity Act, 2003 as amended from time to time;
(3) Ancillary Services	Ancillary Services means in relation to power system (or grid) operation, the services necessary to support the power system (or grid) operation in maintaining power quality, reliability and security of the grid, e.g. active power support for load following, reactive power support, black start, etc;
(4) Agency	A term used in the various sections of the OGC to refer to users that utilise the State Transmission System.
(5) Apparatus	Electrical Apparatus and includes all machines, fittings, accessories and appliances in which conductors are used.
(6) Annexure or Appendix	An Annexure or an Appendix to a Chapter of the Orissa Grid Code.
(7) Area Load Despatch Centre (ALDC)	The Area Load Despatch Centre, as established by SLDC to carry out the instructions of SLDC and perform all the duties assigned to it in the OGC and Distribution Code.
(8) Area of Supply	As defined in the concerned licence.
(9) Automatic Voltage Regulator (AVR)	A continuously acting automatic excitation control system to control the voltage of a Generating Unit measured at the generator terminals.
(10) Auto Transformer	Transformer connecting EHV lines/bus bars of 220 and 132 KV voltages.
(11) Available Transfer Capacity(ATC)	The transfer capability of the transmission system available for scheduling commercial transactions (through long term access, medium term open access and short term open access) in a specific direction, taking into account the network security. Mathematically ATC is the Total Transfer Capability less Transmission Reliability Margin;

(12) Beneficiary	A person who has a share in State Generating Station and Inter State Generating Station.
(13) Bilateral Transaction	Bilateral Transaction means a transaction for exchange of energy (MWh) between a specified buyer and a specified seller, directly or through a trading licensee or discovered at Power Exchange through anonymous bidding, from a specified point of injection to a specified point of drawal for a fixed or varying quantum of power (MW) for any time period during a month;
(14) Black Start	The process of recovery from a total or partial blackout of the Transmission System.
(15) BIS	The Bureau of Indian Standards
(16) Bulk Power Consumer	A person to whom electricity is provided and who has a dedicated supply at 33 KV and above.
(17) Bulk Power Transmission Agreement (BPTA)	The Commercial Agreement between the Transmission Licensee and a long Term Customer for the provision of transmission service.
(18) Capacitor	An electrical facility provided for generation of reactive power.
(19) Captive Generating Plant (CGP)	Captive Generating Plant means a power plant set up by any person to generate electricity primarily for his own use and includes a power plant set up by any cooperative society or association of persons for generating electricity primarily for use of members of such cooperative society or association.
(20) CEA / Authority	The Central Electricity Authority.
(21) Central Generating Station	The generating stations owned by the companies owned or controlled by the Central Government;
(22) Central Transmission Utility(CTU)	Any Government company, which the Central Government may notify under sub-section (1) of Section 38 of the Act;
(23) CERC	The Central Electricity regulatory Commission.
(24) Check Meter	A meter, which shall be connected to the same core of the Current Transformer (CT) and Voltage Transformer (VT) to which main meter is connected and shall be used for accounting and billing of electricity in case of failure of main meter**;**

(25) Collective Transaction	Collective Transaction means a set of transactions discovered in power exchange through anonymous, simultaneous competitive bidding by buyers and sellers
(26) Commercial Committee (CC)	It is a committee of the GCC as referred under Chapter-6 (Annexure-I) of the OGC.
(27) Commission/OERC	Odisha Electricity Regulatory Commission
(28) Congestion	A situation where the demand for transmission capacity exceeds the Available Transfer Capability
(29) Connection	The electric lines and electrical equipment used to effect a Connection of a User's system to the Transmission System.
(30) Connection Agreement	An agreement between the Transmission Licensee and a User setting out the terms relating to the connection to and/or use of the Transmission System which is referred at section 4. 5.
(31) Connection Conditions	The technical conditions to be complied with by any User having a connection to the State Transmission System as laid down in Chapter-4 'Connection Conditions' of the OGC.
(32) Connection Point	A point at which a User's plant and/or Apparatus connects to the State Transmission System.
(33) Contact Person	A person notified by SLDC and Distribution Company on their behalf to carry out responsibility as required under Section-5.4 (4)(d)(v).
(34) Control Area	An electrical system bounded by interconnections (tie lines), metering and telemetry which controls its generation and/or load to maintain its interchange schedule with other control areas whenever required to do so and contributes to frequency regulation of the synchronously operating system;
(35) Control Person	A person identified as having responsibility for cross-boundary safety under Chapter-8 of the OGC. Refer Section 8.3.
(36) Data Acquisition System (DAS)	A system provided to record the sequence of operation in time, of the relays/equipments as well as the measurement of pre-selected system parameters.
(37) Demand	The demand of active power in MW and reactive power in MVAR of electricity unless otherwise stated.

(38) Demand response	Reduction in electricity usage by end customers from their normal consumption pattern, manually or automatically, in response to high UI charges being incurred by the State due to overdrawal by the State at low frequency, or in response to congestion charges being incurred by the State for creating transmission congestion, or for alleviating a system contingency, for which such consumers could be given a financial incentive or lower tariff;
(39) Despatch Schedule	The Ex-power Plant net MW and MWH output of a generating station, scheduled to be exported to the Grid from time to time.
(40) Detailed Planning Data	As referred to Chapter 12 regarding Data registration.
(41) Directive	A policy directive issued by the State Government of Orissa under Sections 37 & 108 of the Act.
(42) Disconnect	The act of physically separating User or Bulk Power Consumer's electrical equipment from the Transmission System.
(43) Distribution Company	An organisation that is licensed, or exempt from the requirements to be licensed to own and/or operate all or part of the Distribution System in the State.
(44) Distribution Licensee	A licensee authorized by the Commission to operate and maintain the Distribution System in the State for supplying electricity to the consumers in his Area of Supply.
(45) Distribution System	"Distribution System" means the system of wires and associated facilities between the delivery points on the transmission lines or the generating station connection and the point of connection to the installation of the consumers
(46) Distribution System Operation & Control Centre (DSOCC)	The Distribution System Operation and Control Centre as established by the Distribution Licensee to carry out the functions as directed by the OGC and Distribution (Planning and Operation) Code.
(47) Disturbance Recorder (DR)	A device provided to record the behaviour of the pre-selected digital and analog values of the system parameters during an event.

(48) Drawal	The import from, or export to, State Transmission System, of electrical energy and power or both active/ reactive powers.
(49) Drawal Schedule	The, Ex-power Plant, MW that a Beneficiary is scheduled to receive from the SGS and ISGS, including bilateral exchanges from time to time.
(50) Eastern Region / Region	Region comprising of the States of West Bengal, Bihar, Orissa, Sikkim, Jharkhand and DVC for the integrated operation of the electricity system.
(51) Electricity Operator	Any person who owns and/ or operates generating plant or who holds a licence under Section 14 of the Act, connected to the Transmission System and any bulk supplier.
(52) Electricity Supply System (Grid)	The combination of the Transmission System, Distribution System and Power Stations.
(53) Eastern Regional Power Committee (ERPC)	Eastern Regional. Power committee established under Section 2(55) of the Act by resolution by the Central Government for facilitating the integrated operation of the Power System in Eastern Region.
(54) Energy Accounting and Audit Meters	Meters used for accounting of the electricity to various segments of electrical system so as to carry out further analysis to determine the consumption and loss of energy therein over a specified time period;
(55) Entitlement	A Share of a beneficiary (in MW / MWh) in the installed capacity/output capability of an ISGS
(56) ERLDC	Eastern Regional Load Despatch Centre established under sub-Section (1) of Section 27 of the Act.
(57) Event	An unscheduled or unplanned occurrence on the Grid including faults, incidents and breakdowns.
(58) Event Logger (EL)	A device provided to record the sequence of operation in time, of the relays / equipments at a location during an event.
(59) External Interconnection/ Connection Point/ Inter Connection Point.	Electric lines and electrical equipment used for the transmission of electricity between the State Transmission System and the User's system.
(60) Extra High Voltage (EHV)	Where the voltage exceeds 33,000 volts under normal conditions, subject, however, to the percentage variation allowed by the Authority.

(61) Ex-power Plant	Net MW/MWH output of a generating Station, after deducting auxiliary consumption and transformation losses.
(62) Fault Locator (FL)	A device provided at the end of a transmission line to measure/indicate the distance at which a line fault may have occurred
(63) Flexible Alternating Current Transmission System (FACTS)	A power electronics based system and other static equipment that provide control of one or more AC transmission system parameters to enhance controllability and increase power transfer capability
(64) Force Majeure	Any event which is beyond the control of the Agencies involved 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 Agency such as but not limited to – a) Acts of God, natural phenomena, including but not limited to floods, droughts, earthquakes and epidemics; b) Acts of any Government domestic or foreign, including but not limited to war declared or undeclared, hostilities, priorities, quarantines, embargoes; c) Riot or civil commotion d) Grid's failure not attributable to Agencies involved
(65) Forced Outage	An outage of a Generating Unit or a transmission facility due to a fault or other reasons, which has not been planned.
(66) Generator	An organisation (including Central/ State or other generating station, in which the State has a full share) that generates electricity and who is subject to the OGC.
(67) Generating Company.	Any company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person, which owns or operates or maintains a generating station.
(68) Generating Unit	An electrical Generating Unit coupled to a turbine within a Power Station together with all plants and Apparatus at that Power Station (up to the Connection Point) which relates exclusively to the operation of that turbo-generator.

(69) Good Utility Practices	Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period which could have been expected to accomplish the desired results at a reasonable cost consistent with good business practices, reliably, safely and with expedition.
(70) Governor Droop.	In relation to the operation of the governor of a Generating Unit, the percentage drop in system frequency which would cause the Generating Unit under free governor action to change its output from zero to full load.
(71) Grid Standards	Grid Standards specified by the Authority under sub-section (d) of Section 73 of the Act.
(72) Grid Co-ordination Committee/ GCC	The Committee formed under Chapter 11.
(73) GRIDCO	Grid Corporation of Orissa Limited registered under the Companies Act, 1956, which is a deemed licensee under the Act and is authorised to trade electricity for supplying to the Distribution Licensees. It can act as a intra State trader.
(74) IE Rules	Indian Electricity Rules, 1956 and shall be replaced by the Regulations which shall be specified by CEA under Section 53 of the Act.
(75) ICT	Transformer connecting EHV lines / bus bars of 400 and 220 Kv voltages.
(76) IEC	International Electro-Technical Commission.
(77) Indian Electricity Grid Code (IEGC)	A document describing the philosophy and the responsibilities for planning and operation of Indian Power System specified by the CERC in accordance with Sub Section 1(h) of Section 79 of the Act.
(78) Independent Power Producer (IPP)	A generating Company not owned / controlled by the Central / State Government
(79) Interface Meters	A meter used for accounting and billing of electricity, connected at the point of interconnection between electrical systems of generating company, licensee and consumers, directly connected to the Inter-State Transmission System or Intra-State Transmission System who have to be covered under ABT and have been permitted open access by the Appropriate Commission**;**

(80) Inter-State Generating Station (ISGS)	A Central and other generating station in which two or more than two States have a share and whose scheduling is to be coordinated by the RLDC.
(81) Inter-State Transmission System (ISTS)	Inter-State Transmission System includes - (i) Any system for the conveyance of electricity by means of a main transmission line from the territory of one State to another State, (ii) The conveyance of energy across the territory of an intervening State as well as conveyance within the State which is incidental to such inter-State transmission of energy, and (iii) The transmission of electricity within the territory of State on a system built, owned, operated, maintained or controlled by CTU.
(82) Lean Period	That period when electrical demand is at its lowest.
(83) Licensee	The holder of a licence in the State of Orissa who has been granted a license under Section 14 of the Act.
(84) License	Any license granted by OERC under Section 14 of the Act.
(85) Load	The MW /MWH/MVAR/MVARh consumed by a utility.
(86) Long Term Access	The right to use the intra-state transmission system for a period of 25 years or more.
(87) Long Term Customer	A person availing or intending to avail access to the STS for a period of 25 years or more and who has signed BPTA with the Transmission Licensee
(88) Maximum Continuous Rating (MCR)	The normal rated full load MW output capacity of a Generating Unit that can be sustained on a continuous basis at specified conditions.
(89) NALCO	National Aluminium Company Limited.
(90) National Grid	The entire inter-connected electric power network of the country.
(91) Net Drawal Schedule	The Drawal Schedule of a Beneficiary after deducting the apportioned transmission losses (estimated).
(92) NTPC	National Thermal Power Corporation Limited.
(93) OHPC	Orissa Hydro Power Corporation Limited.

(94) Operation	A scheduled or planned action relating to the operation of a system.
(95) Operation Co-ordination Committee (OCC)	A committee of ERPC with members from all constituents, which decides the operational aspects of the regional grid.
(96) Open Access	Open Access means the non-discriminatory provision for the use of transmission lines or Distribution System or associated facilities with such lines or system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission
(97) Open Access Customer	Open Access Customer means a consumer permitted by the Commission to receive supply of electricity from a person other than the Distribution Licensee of his Area of Supply, and the expression includes a generating Company and licensee, who has availed of or intends to avail of Open Access.
(98) Operating Margin	Contingency reserve plus Operating Reserve.
(99) Operating Range	The Operating Range of frequency and voltage as specified under the operating code Chapter-5 of this OGC.
(100) Operating Reserve	The additional output from a generating plant, which must be realizable in real-time operation to correct any system frequency fall to an acceptable level, in the event of a loss of generation, or loss of import from an External Interconnection, or mismatch between generation and demand.
(101) OPGC	Orissa Power Generation Corporation Limited.
(102) OPTCL	Orissa Power Transmission Corporation Limited.
(103) Orissa Act	The Orissa Electricity Reform Act, 1995 as referred u/s 185(3) of the Act.
(104) Outage	The reduction of capacity or taking out of service of a Generating Unit, Power Station or part of the Transmission System or Distribution System.
(105) Power System Operational Co - ordination Committee	A committee of SLDC with members from all Agencies, which decides the operational aspects of the State grid as referred under Section 5.8 (4)(i) of the OGC.
(106) Peak Period	That period in a day when electrical demand is at it's highest.

(107) Power Exchange	The power exchange which has been granted registration in accordance with CERC (Power Market Regulations), 2010 as amended from time to time.
(108) Power Purchase Agreement(PPA)	The agreement between a generator and the licensee in which, subject to certain conditions, the licensee agrees to purchase the electrical output of the generator's Generating Unit and the generator agrees to provide services from this unit.
(109) Power Grid (POWERGRID)	The Power Grid Corporation of India Limited, which has been notified as CTU.
(110) Power Station	An installation of one or more Generating Units (even when sited separately) owned and/or operated by the same Generator and which may reasonably be considered as being managed as a single integrated generating complex.
(111) Power System	Power System means all aspects of generation, transmission, distribution and supply of electricity and includes one or more of the following namely: (a) Generating stations; (b) Transmission or main transmission lines; (c) Sub-stations; (d) Tie-lines; (e) Load despatch activities; (f) Mains or distribution mains; (g) Electric supply lines; (h) Overhead lines; (i) Service lines; (j) Works.
(112) Protection Co-ordination Committee (PCC)	It is a committee of the STU as referred under Paragraph 4.8, 5.2(8) and 9.4 of the OGC.
(113) Reactor	An electrical facility specifically designed to absorb Reactive Power.
(114) Regional Transmission System	The combination of EHV electric lines and electrical equipment owned or operated by Power Grid.
(115) Regional Grid	The entire synchronously connected electric power network of the concerned Region, comprising of ISTS. ISGS and intra state systems.
(116) Regional Load Despatch Centre (RLDC)	Regional Load Despatch Centre means the Centre established under sub-section (1) of Section 27 of the Act.
(117) Section	A part of any Chapter of OGC, which is, identified as covering a specific topic.

(118) Single Line Diagram (SLD)	Diagrams, which are a schematic representation of the HV/EHV Apparatus and the connections to all external circuits at a connection, point incorporating its numbering nomenclature and labelling.
(119) System Operational Procedure (SOP)	Procedure for various system operational activities as provided in the OGC.
(120) Site Common Drawing	Drawings prepared for each Connection Point, which incorporates layout drawings, electrical layout drawings, common protection/control drawings and common service drawings.
(121) Spinning Reserve	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.
(122) State	The State of Orissa.
(123) State Generating Station (SGS)	A generating station whose entire generation of electricity is dedicated to the State.
(124) State Load Despatch Centre (SLDC)	This means the centre established under Sub Section 31 of the Act
(125) Standard Planning Data	As referred to in Data Registration Section under Chapter 12.
(126) Standing Committee for Transmission Planning	A Committee constituted by the CEA to discuss, review and finalise the proposals for expansion or modification in the ISTS and associated intra-State systems.
(127) State Transmission System(STS)	The transmission of electricity within the territory of State on a system built, owned, operated, maintained or controlled by STU / Transmission Licensee.
(128) State Transmission Utility(STU)	State Transmission Utility notified by the State Government of Orissa under Section 39 (1) of the Act. OPTCL has been notified as the STU.
(129) Static VAR Compensator (SVC)	An electrical facility designed for the purpose of generating or absorbing reactive power.
(130) Supervisory Control and Data Acquisition / SCADA	The combination of transducers, communication links and data processing systems, which provides information to the SLDC on the operational State of the Transmission System and the generators' Generating Units.
(131) Supplier	A person authorised to sale electricity to licensee(s) or consumer(s) under a license granted under the Act and who is subject to the OGC.

(132) Supply	Supply in relation to electricity, means the sale of electricity to a licensee or consumer.
(133) Technical Co-ordination Committee (TCC)	The committee set up by REB/ RPC to Coordinate the technical and commercial aspects of the operation of the regional grid.
(134) Time Block	Block of 15 minutes each for which special energy meters record specified electrical parameters and quantities with first Time Block starting at 00.00 Hrs.
(135) Transmission Licence	The licence granted by the Commission to transmit electricity in the State under Section14 of the Act.
(136) Transmission Licensee	A licensee authorised by the Commission to establish or operate transmission lines.
(137) Transmission System	Transmission System means the system consisting of Extra High Voltage electric lines, having design voltage of 33 kV and higher owned and/or operated by the licensee for the purposes of the transportation of electricity from one Power Station to a substation or to another Power Station or between substations or to or from any External Interconnection including 33/11 kV bays/equipment up to the interconnection with the Distribution System, any plant and Apparatus and meters owned or used in connection with transmission, and such buildings or part thereof as may be required to accommodate such plant Apparatus, other works and operating staff thereof.
(138) Transmission Reliability Margin (TRM)	The amount of margin kept in the total transfer capability necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions;
(139) Unscheduled Interchange	In a time block for a generating station or a seller means its total actual generation minus its total scheduled generation and for a beneficiary or buyer means its total actual drawal minus its total scheduled drawal;
(140) User	A term utilised in various Sections of the OGC to refer to the Persons including Beneficiaries, Generating Stations, Licensees, Open Access Customers, EHT Consumers, Power Grid, other Regional and States using STS, as more particularly identified in each Section of the OGC.

(141)	Utility	The electric lines or electrical plant, including all lands, buildings, works and materials attached thereto belonging to any person acting as a generating Company or Licensee under provisions of the Act.

Words and expressions used in these Regulations and not defined herein but defined in the Act, IEGC and other Regulations of OERC shall have the meaning assigned to them in under the Act, IEGC and OERC Regulations.

CHAPTER-2

ROLE OF VARIOUS ORGANISATIONS AND THEIR LINKAGES

2.1 INTRODUCTION

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

2.2 ROLE OF SLDC

2.2.1 As per Section 32 of the Act, the functions of the SLDC are as follows:

(1) The SLDC shall be the apex body to ensure integrated operation of the Power System in the State.

(2) The State Load Despatch Centre shall comply with such principles, guidelines and methodologies in respect of wheeling and optimum scheduling and despatch of electricity as may be specified in the OGC.

(3) SLDC shall-

(a) be responsible for optimum scheduling and despatch of electricity within the State, in accordance with the contracts entered into with the licensees or the generating companies operating in Orissa;
(b) monitor grid operations;
(c) keep accounts of the quantity of electricity transmitted through the State grid;
(d) exercise supervision and control over the State Transmission System;
(e) be responsible for carrying out real time operations for grid control and despatch of electricity within the State through secure and economic operation of the State grid in accordance with the Grid Standards and the OGC;
(f) shall comply with the directions of the RLDC;
(d) levy and collect such fees and charges from the generating companies and licensees using the intra State Transmission System as may be specified by the Commission;
(e) discharge the functions assigned to it under the provisions of the Act and these Regulations in an independent and unbiased manner.
Provided that in event of a SLDC being operated by the STU, as per first proviso of sub-section (2) of Section 31 of the Act, adequate autonomy shall be provided to the SLDC in order to discharge its functions in the above mentioned manner.

(4) The State Load Despatch Centre may give such directions and exercise such supervision and control as may be required for ensuring stability of grid operations and for achieving the maximum economy and efficiency in the operation of the power system in the region under its control.

(5) Every licensee, generating company, generating station, substation and any other person connected with the operation of the power system shall comply with the directions issued by the State Load Despatch Centres.

(6) All directions issued by the State Load Despatch Centres to any Transmission Licensee of the State or any other licensee of the State or State Generating Company or substation in the State and shall be duly complied with by the licensee or generating company or sub-station.

(7) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the Sate grid or in relation to any direction given by the State Load Despatch Centre, it shall be referred to the Commission for decision. However, pending the decision of the Commission, the directions of the State Load Despatch Centre shall be complied with by the licensee or the Generating Company, as the case may be.

2.2.2 The following are contemplated as exclusive functions of SLDC

(1) System operation and control including intra-state transfer of power, covering contingency analysis and operational planning on real time basis;
(2) Scheduling / re-scheduling of generation;
(3) System restoration following grid disturbances;
(4) Metering and data collection;
(5) Compiling and furnishing data pertaining to system operation;
(6) Operation of state unscheduled interchange (UI) pool account and State reactive energy account.
(7) Operation of ancillary services

2.2.3 In case of inter-state bilateral and collective short-term open access transactions having a state utility or an intra-state entity as a buyer or seller, SLDC shall accord concurrence or no objection or a prior standing clearance, as the case may be, in accordance with the Central Electricity Regulatory Commission (Open Access in inter-state Transmission) Regulations, 2008 and Orissa Electricity Regulatory Commission (Terms and Conditions of Open Access) Regulations, 2005, amended from time to time.

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

2.2.5 SLDC shall establish Area Load Despatch Centres (ALDC) s to carryout the following functions:

(a) The ALDC shall help in focused monitoring and control of Distribution System in its local area.
(b) Receive and carryout the instructions of SLDC.
(c) Co-ordinate with Distribution System operation and control centre (DSOCC) and SLDC to streamline the operation and enhance case of operation efficiency.

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

(1) Availability of State Transmission System,
(2) Availability and Plant Load Factor for SGS (Thermal) and IPP whose scheduling is done by SLDC,
(3) Capacity Index for SGS (Hydro).

2.3 ROLE OF STU

(1) Section-39 of the Act outlines that the functions of the STU shall be –

(a) To undertake transmission of electricity through the State Transmission System.

(b) To discharge all functions of planning and co-ordination relating to the State Transmission System with

- Central Transmission Utility;
- State Governments;
- Generating companies;
- Regional Power Committees;
- Authority;
- Licensees;
- Any other person notified by the State Government in this behalf;

(c) To ensure development of an efficient, co-ordinated and economical system of the State transmission lines for smooth flow of electricity from a generating station to the load centres;

(d) To provide non-discriminatory Open Access to its Transmission System for use by -

(i) Any licensee or generating Company on payment of the transmission charges; or

(ii) Any consumer as and when such Open Access is provided by the Commission under sub-section (2) of Section- 42 of the Act, on payment of the transmission charges and a surcharge thereon, as may be specified by the Commission.

(2) Until a Government company or any authority or corporation is notified by the State Government, the STU shall operate the SLDC.

2.4 ROLE OF TRANSMISSION LICENSEE

The functions of Transmission Licensee are as follows:

(a) Build, maintain and operate an efficient, co-ordinated and economical Transmission System.

(b) Comply with the directions of SLDC.

(c) Provide Open Access as in 2.3. (1)(d) Above

2.5 ROLE OF DISTRIBUTION LICENSEE

(1) The functions of Distribution Licensee are as follows:

(a) Develop and maintain an efficient, co-ordinated and economical Distribution System in his Area of Supply;

(b) Provide non-discriminatory Open Access to its Distribution System for use by

(i) Any licensee or generating Company on payment of the distribution charges; or

(ii) Any consumer as and when such Open Access is provided by the Commission under sub-section (2) of Section-42 of the Act, on payment of the transmission charges and a surcharge thereon, as may be specified by the Commission.

(2) Establish DSOCC at a strategic location near the geographical centre and load centre of the Distribution Licensees' Area of Supply, having adequate communication facilities. The DSOCC shall be manned round the clock with the required staff during emergency periods. It shall take appropriate action in response to grid warnings as decided by the Distribution Licensee and convey suitable instructions to the operating staff. It shall take timely action in response to grid warnings as per standard instructions laid down by the Distribution Licensee in this regard and if necessary issue appropriate instructions in addition, if a particular situation warrants. The SLDC / ALDC shall intimate the Distribution Licensee through DSOCC, regarding significant deviations of final schedules of State generators and CGS on overall merit order. The DSOCC shall undertake suitable load management and curtailment.

CHAPTER -3

PLANNING CODE FOR THE STATE TRANSMISSION SYSTEM

3.1 INTRODUCTION

(1) The Planning Code specifies the policy and procedures to be applied in planning of State Grid and the regional links.

(2) This Chapter identifies the method for data submissions by Users to the STU for the planning and development of the Transmission System. This Chapter also specifies the technical and design criteria and procedure to be applied by the STU in the planning and development of the Transmission System.

3.2 OBJECTIVE

(1) The provisions of this Chapter are intended to enable the STU in consultation with Users, to provide an efficient, co-ordinated, secure and economical Transmission System in order to satisfy requirement of future demand. It also provides methodology and information exchange amongst Users STU/SLDC and CTU/RLDC, RPC, NLDC and CEA in planning and development of the STS.

(2) A requirement for reinforcement or extension of the Transmission System may arise for a number of reasons, including but not limited to the following.

(a) Development on a User's system already connected to the Transmission System.

(b) The introduction of a new Connection Point between the User's system and the Transmission System.

(c) A general increase in system capacity to remove operating constraints and maintain standards of security.

(d) Stability considerations.

(e) Cumulative effect of any of the above.

(3) Accordingly, the reinforcement or extension of the Transmission System may involve work at an entry or exit point (Connection Point) of a generator or Distribution Company or Open Access customer to the Transmission System.

(4) Since development of all Users' systems must be planned well in advance to permit consents and way leaves to be obtained and detailed engineering design / construction work to be completed, the STU will require information from Users and vice versa. To this effect the Planning Code imposes a time scale, for exchange of necessary information between the STU and Users having regard, where appropriate, to the confidentiality of such information.

3.3 SCOPE

The Planning Code applies to STU, other Transmission Licensees, the State Generating Station, IPPs, IPPs selling power on merchant basis and all other Users, connected to and/or using and involved in developing the State Transmission System.

3.4 PLANNING PHILOSOPHY

(1) CEA would formulate perspective transmission plan for inter-State Transmission System as well as Intra State Transmission System. These perspective transmission plans would be continuously updated to take care of the revisions in load projections and generation scenarios considering the

seasonal and time of the day variations. In formulating perspective transmission plan the transmission requirement for evacuating power from renewable energy sources shall also be taken care of. The transmission system required for open access shall also be taken into account in accordance with National Electricity Policy so that congestion in system operation is minimized.

(2) The STU shall carry out planning process from time to time as per the requirement for identification of major State Transmission System, including the transmission system associated with generation projects and system strengthening schemes, 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 Agencies/ generators/licensees by STU:

(a) Perspective plan formulated by CEA.
(b) Electric Power Survey of India published by the CEA.
(c) Transmission Planning Criteria and guidelines issued by the CEA.
(d) Operational feedback from SLDC.
(e) Reports on National Electricity Policy, issued by Govt. of India, which are relevant for development of the State Transmission System.
(f) Central Electricity Regulatory Commission (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-state Transmission and related matters) Regulations ,2009.
(g) OERC (Terms and Conditions for Open Access) Regulations, 2005
(h) Renewable capacity addition plan issued by Ministry of New and Renewable Energy Sources (MNRES), Govt of India

(3) In addition to the major State Transmission System, the STU shall plan, from time to time, system-strengthening schemes, need of which may arise to overcome the constraints in power transfer and to improve the overall performance of the grid. The State transmission proposals including system-strengthening scheme identified on the basis of the planning studies would be discussed, reviewed and finalised by the STU in consultation with -

(a) Central Transmission Utility,
(b) State Government,
(c) Generating Companies,
(d) Regional Power Committee,
(e) Authority,
(f) Licensees,
(g) Any other person notified by the State Government in this behalf.

(4) As per OERC regulation for providing Open Access in the State transmission, the nodal Agency for arranging the long-term transmission access to the applicant shall be the STU, if its system is used and for the short-term transmission access shall be the SLDC.

(5) In case long-term Open Access in State Transmission System cannot be allowed without system strengthening, the applicant may request STU to carry out system studies to identify strengthening requirement and its cost estimates.

Further, to provide long-term Open Access as per the terms and conditions formulated by OERC and STU from time to time, the application for long-term Open Access including system strengthening identified by STU in State Transmission System shall be discussed and finalised in consultation with other Agencies.

(6) All Users and Agencies will supply to the STU, the desired planning data from time to time to enable to formulate and finalize its plan.

(7) The plan reports shall contain a Chapter on additional transmission requirement, which may include not only State transmission lines but also additional equipment such as transformer, capacitors, reactors etc.

(8) The plan report shall also indicate the action taken to fulfill the additional requirement and actual progress made on new schemes. These reports will be available to any interested party for making investment decision/connection decisions to the State Transmission System.

(9) As voltage management plays an important role in inter/intra State transmission of energy, special attention shall be accorded to planning of capacitors, reactors, Static VAr Compensators (SVC) and Flexible Alternative Current Transmission Systems (FACTS), etc.

(10) Based on Plans prepared by the CTU, STU shall have to plan their systems to further evacuate power from the ISTS/STS and to optimize the use of integrated transmission network.

In case of long-term Open Access applications requiring any strengthening in the Distribution System to absorb/evacuate power beyond STS, the STU shall co-ordinate with the concerned Distribution Company(s). The Distribution Company(s) shall augment the Distribution System in a reasonable time to facilitate the interchange of such power.

(11) The Inter-State Transmission System and associated State Transmission System are complementary and inter-dependent and planning of one affects the other's planning and performance. Therefore, the associated State Transmission System shall also be discussed and reviewed before implementation during the discussion for finalising State Transmission System proposal indicated at section 3.4 (3) above**.**

3.5 PLANNING CRITERION

General Policy

(1) The planning criterion is based on the security philosophy on which the State Transmission System has been planned. The security philosophy may be as per the Transmission Planning Criteria and other guidelines as given by CEA. The general policy shall be as detailed below:

(a) As a general rule, the State Transmission System shall be capable of withstanding and be secured against the following contingency outages

a. without necessitating load shedding or rescheduling of generation during steady State operation:
   - Outage of a 132 kV S/C line or,
   - Outage of a 220 kV S/C line or,
   - Outage of a 400 kV S/C line or,
   - Outage of single Interconnecting transformer, or
   - Outage of one pole of HVDC bipolar line, or one pole of HVDC back to back Station or
   - Outage of 765 kV S/C line.

b. without necessitating load shedding but could be with rescheduling of generation during steady state operation-
- Outage of a 400 kV S/C line with TCSC, or
- Outage of a 400kV D/C line, or
- Outage of both pole of HVDC Bipole line or both poles of HVDC back to back Station or
- Outage of a 765kV S/C line with series compensation.

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

(b) The State Transmission System shall be capable of withstanding the loss of most severe single system in feed without loss of stability.

(2) Any one of these events defined above shall not cause:

(a) Loss of supply

(b) Prolonged operation of the system frequency below and above specified limits.
(c) Unacceptable high or low voltage
(d) System instability
(e) Unacceptable overloading of the State Transmission System element.

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

(4) STU shall carry out planning studies for reactive power compensation including reactive power compensation requirement at the existing generator's/ bulk consumer's switchyard and for connectivity of new generator / bulk consumer to the state transmission system.

(5) Suitable System Protection Schemes may be planned by SLDC in consultation with CEA, CTU, ERPC and the Users, either for enhancing transfer capability or to take care of contingencies beyond that indicated in a(1) above

3.6 PLANNING DATA REQUIREMENT

(1) Under this Planning Code, the Distribution Licensees/State generating companies/ IPPs/licensees are to supply two types of data to STU:

(a) Standard Planning Data

To enable the STU to discharge its responsibilities under the licence, to conduct system studies and prepare perspective plans for electricity demand, generation and transmission as detailed in Section 3.8 below, the Users shall furnish data to the STU from time to time as detailed under Data Registration Chapter in this OGC and categorised as Planning Data (PD).

(i) Standard planning data consists of details, which are expected to be normally sufficient for the STU to investigate the impact on the STS due to User development.

(ii) Standard planning data covering (a) preliminary project planning data (b) committed project planning data and (c) connected planning data should be furnished by the Distribution Licensees and Generating companies connected to the STS. This data shall be furnished to STU from time to time in the standard formats supplied by the STU.

(b) Detailed Planning Data

To enable Users to co-ordinate planning, design and operation of their plants and systems with the Transmission System they may seek certain salient data of Transmission System as applicable to them, which the STU shall supply from time to time as detailed under Data Registration Chapter of this OGC and categorised as Detailed System Data (Transmission).

Detailed planning data consist of additional, more detailed data not normally expected to be required by STU to assess the impact of User development on the STS. The Users of STS shall furnish this data as and when requested by STU.

3.7 IMPLEMENTATION OF TRANSMISSION PLAN

The actual program of implementation of transmission lines, interconnecting transformers, reactors/capacitors and other transmission elements will be determined by STU in consultation with the concerned Agencies / Users. The Transmission Licensee through the concerned Agency shall ensure the completion of these works in the required time frame.

3.8 PERSPECTIVE PLAN

(1) The STU is charged with the responsibility to prepare and submit a long-term (10 years) plan to the Commission for Transmission System expansion to meet the future demand in accordance with the Licence Conditions.

(2) For fulfilment of the above requirement the STU shall:

(a) Forecast the demand for power within the State in each of the succeeding five years and provide to the Commission details of the demand forecasts, data, methodology and assumptions on which the forecasts are based.

(b) GRIDCO shall Prepare a least cost generation plan for the State to meet the ten years load demand as per the forecast, after examining the economic, technical and environmental aspects of all available alternatives taking into account the existing contracted generation resources and effects of demand side management.

(c) Discharge all functions of planning and co-ordination relating to the State Transmission System compatible with the above load forecast and generation plan a long-term (10 years) plan for the Transmission System in accordance with Section-39 (2) (b) of the Act, compatible with the above load forecast and generation plan in consultation with CEA. Central Transmission Utility (CTU) shall have to be consulted in connection with systems to evacuate power from inter-State Transmission System.

(3) The STU shall prepare and submit to the Commission on an annual basis, a statement showing in respect of each of the 5 succeeding financial years forecasts of circuit capacity, power flows and loading on the Transmission System under

Transmission Licence General Conditions Clause-15.5 of Appendix 4B to OERC (Conduct of Business) Regulations, 2004.

3.9 PLANNING STANDARDS AND PROCEDURES

The Transmission System shall be planned in accordance with the Transmission System planning and security standards under Transmission Licence General Conditions Clause-13 of Appendix 4B to OERC (Conduct of Business) Regulations, 2004.

The generation expansion planning shall be carried by GRIDCO out in accordance with the Power Supply Planning and Security Standards under aforesaid Clause-13.

3.10 PLANNING RESPONSIBILITY

(1) The primary responsibility of load forecasting within its area rests with each of the Distribution Companies. The Distribution Companies shall determine peak load and energy forecasts of their respective areas for each category of loads for each of the succeeding five years and submit the same annually by 31st December to the Transmission Licensee along with details of the demand forecasts, data, methodology and assumptions on which the forecasts are based. The load forecasts shall be made for each of the External Connection Points between the STU and User and shall include annual peak load and energy projections and daily load curve. The demand forecasts shall be updated annually or whenever major changes are made in the existing forecasts or planning. While indicating requirements of single consumer with large demands (5 MW or higher) the Distribution Company shall satisfy itself as to the degree of certainty of the demand materialising.

(2) The STU is responsible for integrating the load forecasts submitted by each of the Distribution Companies and determining the long term (10 years) load forecasts for the State within ninety days of the date on which the distribution companies furnished all the required information consistent to provisions of the OGC. In doing so the STU may apply appropriate diversity factors, and satisfy itself regarding probability of materialisation of bulk loads of consumers with demands above 5 MW in consultation with that Distribution Company concerned.

(3) The STU may also review the methodology and assumptions used by the Distribution Company in making the load forecast, in consultation with the Distribution Company. The resulting overall load forecast will form the basis of planning for expansion of generation and the Transmission System.

(4) In the event, Distribution Companies failed to provide all the requisite information within the time frame and in accordance with the form provided by the STU, the STU shall approach to the Commission for a directive.

CHAPTER– 4

CONNECTION CONDITIONS

4.1 INTRODUCTION

Connection Conditions specify the minimum technical and design criteria, which shall be complied with by STU/Transmission Licensee and any Agency connected to or seeking the connection to the State Transmission System. Such agencies, connected to or seeking the connection to the State Transmission System shall comply with CEA (Technical Standards for connectivity to the Grid) Regulations, 2007. They also set out the procedures by which Transmission Licensee shall ensure compliance by any Agency with above criteria as pre-requisite for the establishment of an agreed connection.

4.2 OBJECTIVE

The objective of this Section is to ensure the following:

(1) To ensure the safe operation, integrity and reliability of the grid.

(2) That the basic rules for connectivity are complied with in order to treat all users in a non-discriminatory manner.

(3) Any new or modified connections, when established, shall neither suffer unacceptable effects due to its connections to the State Transmission System nor impose unacceptable effects on the system of any other connected Agency.

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

(5) Any person seeking a new connection to the grid is required to be aware, in advance, of the procedure for connectivity to the STU and also the standards and conditions his system has to meet for being integrated into the grid.

(6) The ownership and responsibility for all items of equipment is clearly specified in a schedule (Site Responsibility Schedule) for every site where a connection is made.

4.3 SCOPE

(1) The Connection Conditions apply to all STU/SGSs and any other User/ Licensee connected to and involved in developing the State Transmission System. This Connection Code also applies to all Agencies, which are planning to generate/transmit/utilise and/or are generating / transmitting / utilising energy to/from the State Transmission System. The Connection Conditions for Generating Units embedded in the Distribution Systems, and not connected to the Transmission Systems, shall be finalised by the respective Distribution Licensees and Generators. However, such entities shall abide by the CEA (Technical Standards for connectivity to the Grid) Regulations, 2013, in order to ensure that the integrated grid is not adversely affected.

(2) These conditions shall apply to all new connections. All the existing Users shall modify their systems for complying with this Section within two years from the date of this Code comes into effect.

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

(1) Prior to an Agency being connected to the State Transmission Systems all necessary conditions outlined in the OGC in addition to other mutually agreed requirements to be complied with, must be fulfilled by the Agency. Any Agency

seeking to establish new or modified arrangements for connection to and/or use of the Transmission System shall submit the following report, data and undertaking along with an application to the Transmission Licensee:

(a) Report stating purpose of proposed connection and/or modification, connection site, Transmission Licensee to whose system connection is proposed Connection Point, description of Apparatus to be connected or modification to Apparatus already connected and Beneficiaries of the proposed connection.

(b) Data as applicable and as listed in the Data Registration Chapter in this OGC

(c) Construction schedule and target completion date.

(d) An undertaking that the User shall abide by the OGC, IEGC and provisions of IE Rules and various standards including Grid Connectivity Standards made pursuant to the Act for installation and operation of the Apparatus.

(2) However in case of the existing connections between State Transmission System and State Generating Station, a relaxation of one year in respect of the Connection Conditions is allowed so that the present arrangements may continue. The process of re-negotiation of the Connection Conditions with generating station should be completed within a period of one year. In case it is determined that the compliance of Connection Conditions would be delayed further, the Commission may consider further relaxation for which a petition will have to be filed by the concerned User along with STU's recommendation/comments. The cost of modification, if any, shall be borne by the concerned User.

(3) The Transmission Licensee/STU shall normally make a formal offer to the User within one month of receipt of the application complete with all information as may reasonably be required, subject to provision in section 4.4(6) below.

(4) The offer shall specify and take into account any works required for the extension or reinforcement of the Transmission System to satisfy the requirements of the connection application and for obtaining statutory clearances, way leaves as necessary.

(5) In respect of offers for modification of existing connection, the terms shall take into account, the existing Connection Agreement.

(6) (a) If the nature of complexity of the proposal is such that the prescribed time limit for making the offer is not adequate, the Transmission Licensee / STU shall make a preliminary offer within the prescribed time limit indicating the extent of further time required with the consent of the Commission for more detailed examination of the issues.

(b) On receipt of the preliminary offer, the User shall indicate promptly whether the Transmission Licensee/STU should precede further to make a final offer within the extended time limit.

(7) All offers (other than preliminary offers) including revised offers shall remain valid for sixty days of issue of offer.

(8) The Transmission Licensee / STU shall make a revised offer, upon request by a User, if necessitated by changes in data earlier furnished by the User.

(9) In the event of the offer becoming invalid or not being accepted by any User within the validity period, no further action shall be taken by the Transmission Licensee / STU on the connection applications.

(10) The Transmission Licensee / STU may reject any application for connection to and/or use of Transmission System:

(a) If such proposed connection will violate any provision(s) under clause-15.3 to Appendix-4B to OERC (Conduct of Business) Regulations, 2004.

(b) If the proposed works stated in the application do not lie within the purview of the licence or do not conform to any provision of the OGC.

(c) If the applicant fails to give confirmation and undertakings according to sections 4.4(1)(d) of this Chapter.

4.5 CONNECTION AGREEMENTS

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

(1) A condition requiring both parties to comply with the OGC;
(2) Details of connection, technical requirements with specific references to reactive power compensation/operation of Generating Units and Power Station, if any, and commercial arrangements, (in accordance with relevant provision of Indian Electricity Grid Code wherever applicable).
(3) Details of any capital related payments arising from necessary reinforcement or extension of the system, data communication, RTU etc. and demarcation of the same between the concerned parties;
(4) A Site Responsibility Schedule as referred at section 4.13(1);
(5) General philosophy, guidelines etc. on protection and telemetry.

A model Connection Agreement is placed at Annexure-1 to Chapter-4**.**

4.6 PROCEDURE FOR SITE ACCESS, SITE OPERATIONAL ACTIVITIES AND MAINTENANCE STANDARDS

(1) The Connection Agreement will also indicate any procedure necessary for site access, site operational activities and maintenance standard for equipment of the STU/Transmission Licensee at SGS/Licensee premises and vice-versa.

(2) The User owning the connection site shall provide reasonable access and other required facilities to another User whose equipment is installed at the connection site for installation, operation and maintenance, etc.

4.7 SYSTEM PERFORMANCE

Transmission System Parameter variations

(1) General

Within the Power System, instantaneous values of system frequency and voltage are subject to variation from their nominal value. All Agencies shall ensure that plant and

Apparatus requiring service from/to the State Transmission System is of such design and construction that satisfactory operation will not be prevented by such variation.

(2) Frequency variations

Rated frequency of the system shall be 50.0 Hz and shall normally be controlled within the limits as per regulations /Standards framed by the Authority subject to allowable limit as specified by the manufacturer.

(3) Voltage variations

(a) The variation of voltage may not be more than the voltage range specified in the regulations / Standards framed by the Authority.

(b) The Agency engaged in sub-transmission and distribution shall not depend upon the State Transmission System for reactive support when connected. The Agency shall estimate and provide the required reactive compensation in its transmission and distribution network to meet its full reactive power requirement, unless specifically agreed to with STU/Transmission Licensee.

(4) Harmonics

Total Voltage Harmonic Distortion (THD) in the Power System is required to be within the limit for various applications. (Refer IEEI Standard 519)
Voltage THD is generally defined as below:

Total Harmonic Distortion of the voltage waveform is the VTHD, which is the ratio of the root-sum-square value of the harmonic content of the voltage to the root-mean-square value of the fundamental voltage.

$$V_{THD} = \frac{\sqrt{V_2^{\,2} + V_3^{\,2} + V_4^{\,2} + V_5^{\,2} + V_6^{\,2} + \ldots..}}{V_1} \quad X\ 100\%$$

The limits of harmonics shall be maintained as per CEA's notification of Grid Standards from time to time, the current limits are as specified hereunder:

System voltage (kV rms)	Total Harmonic Distortion (%)	Individual Harmonic of any particular Frequency (%)
765	1.5	1
400	2	1.5
220	2.5	2
33 to 132	5	3

(5) Insulation Co-ordination and Rupturing capacity of Switchgear

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

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

(1) General

All equipment connected to the State Transmission System shall be of such design and construction as to satisfy at least the requirements of the relevant Bureau of Indian Standards (BIS)/IEC/ prevailing Code of Practice.

Installation of all electrical equipment shall comply with IE Rules.

For every new connection sought, the Transmission Licensee shall specify the Connection Point and the voltage to be used, along with the metering and protection requirements as specified in the Metering and Protection Chapter.

(2) Sub-Station Equipment

(a) All EHV sub-station equipments shall comply with Bureau of Indian Standards (BIS)/ IEC/prevailing Code of practice.

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

(c) Each connection between a User and State Transmission System shall be controlled by a circuit breaker capable of interrupting, at the Connection Point, the short circuit current as advised by Transmission Licensee in the specific Connection Agreement.

(3) Fault Clearance Times

(a) The fault clearance time when all equipments operate correctly, for a three phase fault (close to the bus-bars) on User's equipment directly connected to State Transmission System and for a three phase fault (close to the bus-bars) on State Transmission System connected to Agencies equipment, shall not be more than:
   (i) 100 milli seconds (ms) for 800 kV & 400 kV
   (ii) 160 milli seconds (ms) for 220 kV & 132 kV

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

(4) Protection

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

Protection systems are required to isolate the faulty equipments and protect the other components against all types of faults, internal/ external to them, within the specified fault clearance time with reliability, selectivity and sensitivity. All Agencies connected to the State Transmission System shall provide protection systems and metering systems as

agreed in the Connection Agreement conforming to Protection and Metering Chapter of the OGC (i.e. Chapters 9&10)

Relay setting coordination shall be done at State level by the Protection Co-ordination committee of the STU as specified under Section 5.2(8) and 9.4 of the OGC.

4.9 GENERATING UNITS AND POWER STATIONS

(1) A Generating Unit shall be capable of continuously supplying its normal rated active / reactive output within the system frequency and voltage variation range indicated at section 4.7 above, subject to the design imitations specified by the manufacturer.
(2) A Generating Unit shall be provided with an AVR, protective and safety devices, as set out in Connection Agreements.
(3) Each Generating Unit shall be fitted with a turbine speed governor having an overall droop characteristic within the range of 3% to 6% subject to design limitations specified by the manufacturer , which shall always be in service.
(4) Each Generating Unit shall be capable of instantaneously increasing output by 5% when the frequency falls limited to 105% MCR. Ramping back to the previous MW level (in case the increased output level can not be sustained) shall not be faster than 1% per minute.
(5) Apart from the above required specified in point 1 to 4, all generating unit supplying power to state GRID, shall comply with CEA (Technical Standards for Connectivity to the Grid) Regulations 2007 and the amendments thereto.
(6) For existing Power Stations, the equipment for data transmission and communications shall be owned and maintained by the Licensee i.e. STU, unless alternative arrangements are mutually agreed.
For new Power Stations, the equipment for data transmission and communications shall be owned and maintained by the respective generator

4.10 REACTIVE POWER COMPENSATION

(1) Reactive power compensation and/or other facilities, should be provided by Transmission Licensee and Distribution Licensees as far as possible in the low voltage systems close to the load points thereby avoiding the need for exchange of reactive power to/from State Transmission System and to maintain Transmission System voltage within the specified range.
(2) Line reactors may be provided to control temporary over voltage within the limits as set out in Connection Agreements.
(3) The additional reactive compensation to be provided by the User shall be indicated by Transmission Licensee in the Connection Agreement for implementation.
(4) The user already connected to the grid shall also provide additional reactive compensation as per the quantum and time frame decided by respective STU in consultation with SLDC. The Users and Distribution Licensee shall provide information to STU and SLDC regarding the installation and healthiness of the reactive compensation equipment on regular basis. STU shall regularly monitor the status in this regard.

4.11 DATA COMMUNICATION FACILITIES

Reliable and efficient speech and data communication systems shall be provided to facilitate necessary communication and data exchange, and supervision/control of the grid by the SLDC, under normal and abnormal conditions. All Agencies including CGS who are allowed open access shall provide Systems to telemeter power system parameter such as flow, voltage and status of switches/ transformer taps etc. in line with interface

requirements and other guideline made available to the nearest SCADA Interface Point of the Transmission Licensee. The associated communication system to facilitate data flow up to the nearest SCADA Interface Point of the Transmission Licensee, as the case may be, shall also be established by the concerned Agency as agreed by STU in Connection Agreement. All Agencies in coordination with STU shall provide the required facilities at their respective ends and the nearest SCADA Interface Point of the Transmission Licensee as agreed in the Connection Agreement. However, the SCADA communication facilities should be made available in every 220 KV grid S/S by OPTCL.

4.12 SYSTEM RECORDING INSTRUMENTS

Recording instruments such as Data Acquisition System / Disturbance Recorder/ Event Logger / Fault Locator (including time synchronization equipment) shall be provided in the State Transmission System for recording of dynamic performance of the system. Users shall provide the entire requisite recording instruments as stated in the Connection Agreement according to the agreed time schedule and shall always keep them in working condition.

4.13 RESPONSIBILITIES FOR OPERATIONAL SAFETY

(1) Site Responsibility Schedule

STU and the concerned Users shall be responsible for safety in accordance with Central Electricity Authority (Technical Standards for connectivity to the Grid) Regulations, 2007, Orissa Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulation, 2005, Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulations, 2010 and CEA "Safety requirements for Construction, Operation and Maintenance of electrical Plants and Electrical Lines, Regulation 2011" and the respective amendments thereof.

STU / Transmission Licensee and other Users concerned shall be responsible for safety as indicated in Site Responsibility Schedules for each Connection Point.

(a) For every connection to the Transmission System for which a Connection Agreement is required, a schedule of equipment shall be prepared by the Transmission Licensee with information supplied by the respective Users. This schedule, called a Site Responsibility Schedule, shall state the following for each item of equipment installed at the connection site:

(i) The ownership of Plant/Apparatus
(ii) The responsibility for control of Plant/Apparatus.
(iii) The responsibility for maintenance of Plant/Apparatus.
(v) The responsibility for operation of Plant/Apparatus
(vi) The manager of the site.
(vii) The responsibility for all matters relating to safety of persons at site.

An illustrative Site Responsibility Schedule is provided at Appendix-II to Chapter-4.

(b) The User owning the connection site shall provide reasonable access and other required facilities to another User whose equipment is installed at the connection site for installation, operation and maintenance, etc.

(c) The format, principles and basic procedure to be used in the preparation of Site Responsibility Schedules shall be formulated by STU and shall be provided to each Agency/regional constituents for compliance.

(d) All Agencies connected to or planning to connect to STS would ensure providing of RTU and other communication equipment, as specified by STU, for sending real-time data to the nearest SCADA Interface Point of the Transmission Licensee at least before date of commercial operation of the generating stations or sub-station/line being connected to STS.

(2) **Single Line Diagrams**

(a) Single Line Diagram shall be furnished for each Connection Point by the connected Users to SLDC. These diagrams shall include all HV/EHV connected equipment and 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/EHV Apparatus and related plant.

(b) Whenever any equipment has been proposed to be changed, then concerned User shall intimate the necessary changes to Transmission Licensee and to all concerned. When the changes are implemented, changed Single Line Diagram shall be circulated by the User to SLDC / STU / Transmission Licensee.

(3) **Site Common Drawings**

(a) Site Common Drawing will be prepared for each Connection Point and will include site layout, electrical layout, details of protection and common services drawings. Necessary details shall be provided by the User to STU / Transmission Licensee.

(b) The detailed drawings for the portion of the Agency and STU / Transmission Licensee at each Connection Point shall be prepared individually and copies shall be handed over to other party.

(c) If any change in the drawing is found necessary, the details will be furnished to other party as soon as possible.

4.14 **SCHEDULE OF ASSETS OF STATE GRID**

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

4.15 **CYBER SECURITY**

All utilities shall have in place, a cyber security framework to identify the critical cyber assets and protect them so as to support reliable operation of the grid.

4.16 **CONNECTION POINT**

(1) Generator (including CGP)

Voltage may be 33 kV and above. The Connectivity of User (consumer) or Generator including CGP at 33 KV or at any higher voltage level should be decided mutually on techno-commercial analysis and system study. The Connectivity at 33 KV may normally be allowed for any Generator including CGP upto 25 MW for dedicated line (tie line) and upto 15 MW in case of non-dedicated (non-tie) line. Unless specifically agreed with the Transmission Licensee the Connection Point shall be the outgoing feeder gantry of Power Station switchyard. Metering point shall be at the outgoing feeder. All the terminal communication, protection and metering equipment owned by the generator

within the perimeter of the generator's site should be maintained by the generator. The respective Users shall maintain other Users' equipment. From the outgoing feeder gantry onwards, the Transmission Licensee shall maintain all electrical equipment.

(2) Distribution Company

Voltage may be 33/11 kV or as agreed with the Transmission Licensee. The Connection Point shall be the outgoing feeder gantry of the Transmission Licensee's sub-station. The metering point shall be at the outgoing feeder. The Transmission Licensee shall maintain all the terminal, communication, protection and metering equipment within the premises of the Transmission Licensee. From the outgoing feeder gantry onwards, the respective Distribution Company shall maintain all electrical equipment.

(3) Eastern Regional Transmission System

For the Eastern Regional Transmission System, the connection, protection scheme, metering scheme, metering point and the voltage shall be in accordance with the mutual agreement between Power Grid and the State Transmission Licensee.

(4) Bulk Power Consumers

Voltage may be 400/220/132/33 kV or as agreed with the Transmission Licensee and Bulk Power Consumers' own sub-stations. The Connection Point shall be the feeder gantry on their premises. The metering point shall be at the Transmission Licensee's sub-station or as agreed with the Transmission Licensee.

4.16 DATA REQUIREMENTS

Users shall provide the Transmission Licensee with data for this Chapter as specified in the Data Registration Chapter.

4.17 APPENDIX OF CHAPTER-4

Model Connection Agreement-	Annexure-I to Chapter-4
General format for Site Responsibility Schedule-	Annexure-II to Chapter-4.

ANNEXURE-I TO CHAPTER-4

CONNECTION AGREEMENT
(Refer Section-4.5)

THIS AGREEMENT for connection to and use of Transmission System of _____ (Name of the Transmission Licensee) is made this . . . . day of . . . . . month of . . . . . year.

BETWEEN

[1] ----------(Name of the Transmission Licensee) whose registered office is at ---------- ---------- ----------, AND

[2] ……. (Name of the company) whose registered office is at …… (detailed address) therein after called "User"

WHEREAS

[A] ---------- ---------- ----------(Name and address of the Transmission Licensee) is a Transmission Licensee granted by the OERC as per the provision of the Electricity Act, 2003 (here after called as the 'Act') agreed to execute a Connection Agreement for the purpose export/import of power at 400/220 kV/132 kV to ---------- ---------- (name of the User)

[B] ……(Name of the Distribution Company (the User) is the holder of the Orissa Distribution Licence, (No……..) issued by OERC vide order dated----------.

[C] …… (Name of the User i.e. Generator / CGP / Bulk Consumer) is the holder of the authorization issued by the State Government / Central Government / CERC / OERC vide order No……. dated.

NOW IS HEREBY AGREED AS FOLLOWS

(i) Grid Code Compliance

It is agreed that the User …… and ----------(the Transmission Licensee) will abide by the provisions of the Orissa Grid Code (OGC)/Indian Electricity Grid Code (IEGC) in force for the purpose of availing / evacuating power from / to ----------(the Transmission Licensee) and to maintain a connectivity with the Transmission System network of ----------(the Transmission Licensee).

(ii) Terms of agreement

(a) This agreement shall be deemed to have commenced from. and shall continue until it is terminated. In case of any differences or disagreements between the Transmission Licensee and the User in regard to any changes required from time to time to the terms of this agreement the same shall be resolved amicably failing which the matters shall be referred to the OERC and the Commission's decision shall be final and binding.

(b) The term of this Agreement shall stand modified or terminated automatically as per the Regulations which OERC may issue from time to time in accordance with the functions and powers of the Commission under the Act. As soon as

practicable following any Regulation of the Commission which has the effect of modifying the terms of this Agreement, the Transmission Licensee shall prepare a revised version of this agreement, incorporating the modified term and following Agreement between the Transmission Licensee and User that the revised version accurately reflects the relevant Regulation, the User shall execute the revised version.

(c) No User shall assign the Agreement or transfer or part with the benefits under the Agreement in favour of any other person/User without the express consent or approval of the Transmission Licensee.

(d) Any connection, which has been unauthorisedly transferred or parted with, shall be liable for disconnection after expiry of a seven days notice calling for explanation and considering the explanation submitted by him.

(e) The User agrees to bear the cost of stamp duty and all cost incidental to the execution of this agreement in full.

(iii) Details of Connection

(a) System of supply voltage:
(b) Total contract demand:
(c) Phasing of the contract demand:
(d) Connection details:
(LILO arrangement of transmission line with a switching station/from a bay of an existing grid substation of the Transmission Licensee) (Details to be mentioned)
(e) Details of reactive power compensation arrangement:
(f) Details of the scheme of the switching station/bay
i. Bus-bar arrangement: Three bus system/Two bus system/main and transfer bus system, Bus-bar type
ii. Provision for future expansion
(g) Captive Generating Plant:
i. Rated capacity:
ii. Rated voltage level of generation:
iii. Quantum of surplus power to be evacuated:
iv. Details of the connectivity with the Transmission Licensee's network:
v. Mode of communication connectivity with the nearest SCADA Interface Point of the Transmission Licensee: Telephone/Fax/ Carrier communication/ Broad Band Communication/Internet/other developed mode of communication.

Transmission Licensee shall provide SCADA Interface in every 220 KV grid S/S.

(h) Communication arrangement: The User shall be required to provide voice and other communication facility as decided by SLDC.
(i) Metering Arrangement: The User shall provide meters for accounting and audit purposes as per the standard specified by CEA.
[Details of operational/commercial (tariff) metering scheme to be provided.] Detail data are to be provided as per Chapter-12 (DATA REGISTRATION) of the State Grid Code (OGC).
(j) Other Charges:
The operation and maintenance charges of the transmission line details to be indicated, 400/220 kV/132 kV feeder bay (nos. of bays and location of grid substation to be indicated), 400/220 kV/132 kV switching station (details of

bays etc. to be indicated) shall be governed by the provisions contained in Chapter-12**.**

i. Entry Charges and Exit Charges as fixed by the Transmission Licensee & approved by OERC to be paid where appropriate.

ii. Capital related payment arising from necessary reinforcement or extension of the System is to be paid.

(k) Site Responsibility Schedule:

The site responsibility schedule is annexed at Annexure-II to Chapter-4, of the State Grid Code (OGC):

(l) Protection Scheme**:**

Protection scheme shall be provided in the User's system to protect the grid from the faults originating in their system and so also for safeguarding their system from the fault originating from the Transmission System. The protection scheme of the User's system shall have the approval of OPTCL.

i. Transmission line protection scheme: (please indicate the general philosophy of the scheme)

ii. 220 kV / 132 kV feeder bay protection scheme: (please indicate the general philosophy of the scheme)

iii. General protection scheme adopted for the switching station: (please indicate the general philosophy of the scheme).

iv. Any other protection scheme provided:

(m) Documents forming part of this agreement:

i. Annexure-I: Data to be provided as per Chapter-12 of the OGC

ii. Annexure-II: Attested copies of the Transmission Licensee permission letter no _____, date _____

iii. Annexure-II (to Chapter-4): Site Responsibility Schedule.

iv. Detail of procedure necessary for Site Access, Site Operational Activities and maintenance Standards for equipments of the STU/Transmission Licensee at STU/Transmission Licensee premises and vice versa as Annexure-III

AS WITNESS the hands of the Parties hereto or their duly authorized representative on this …… day of month of ……. Year

SIGNED BY	**SIGNED BY**
For & on behalf of User	**for & on behalf of the Transmission Licensee**
WITNESSES: 1)	1)
2)	2)

Bhubaneswar

Date: The …….. Day of ……..Month of …….. Year

ANNEXURE-II TO CHAPTER-4
Ref: Section-4.13 (1)(a)

CONNECTION CONDITIONS

SITE RESPONSIBILITY SCHEDULE

Name of Power Station/Sub-station: . . . . . .

Site Owner: . . . . . .
Tel. Number: . . . . . .
Fax Number: . . . . . .

Item of Plant/Apparatus 1	Plant Owner 2	Safety Responsibility 3	Control Responsibility 4	Operation Responsibility 5	Maintenance Responsibility 6	Remarks 7
... ……. KV Switchyard						
All equipment including bus bars						
Feeders						
Generating Units						

CHAPTER- 5

OPERATING CODE FOR STATE GRID

5.1 OPERATING POLICY

(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. Users shall cooperate with each other and adopt good utility practice at all times for satisfactory and beneficial operation of the State grid.

(2) Overall operation of the State grid shall be supervised from the SLDC. The role of SLDC, STU/Transmission Licensee and Distribution Licensees shall be in accordance with the provisions made in Chapter-2 of the OGC.

(3) All Users shall comply with this Operating Code, for deriving maximum benefits from the integrated operation and for equitable sharing of obligations.

(4) All licensees, generating company, generating station and any other person connected with the operation power system shall comply with the directions issued by the SLDC to ensure integrated grid operation and for achieving the maximum economy and efficiency in the operation of the power system.

(5) A set of detailed internal System Operational Procedures for State grid shall be developed and maintained by the SLDC in consultation with the Users and shall be consistent with OGC to enable compliance with the requirement of this OGC.

(6) The control rooms of the SLDC, power plants, substation of 132 kV and above, and any other control centres of all Users shall be manned round the clock by qualified and adequately trained personnel.

5.2 SYSTEM SECURITY ASPECTS

(1) All Users shall endeavour to operate their respective Power Systems and Power Stations in synchronism with each other at all times, such that the entire system within the State operates as one synchronized system.

(2) No part of the grid shall be deliberately isolated from the rest of the State grid, except

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

(b) for safety of human life

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

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

(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 by the SLDC in consultation with the Users, and be available at the websites of SLDC. This list shall have to be notified by SLDC from time to time specifying the scheduled power flow and operational security margin. In case of opening / removal of any important element of the grid under an emergency situation, the same shall be communicated to SLDC at the earliest possible time after the event. SLDC shall inform the opening/removal of the important elements of the state grid, to RLDC, and to the concerned Regional Entities (whose grid would be affected by it) as specified in the detailed operating procedure by RLDC/NLDC.

(4) Any tripping, whether manual or automatic, of any of the above elements of State grid shall be precisely intimated by the Users to SLDC as soon as possible, say within ten minutes of the event. The reason (to the extent determined) and the likely time of restoration shall also be intimated. All reasonable attempts shall be made for the elements' restoration as soon as possible. SLDC shall inform the opening/removal of the important elements of the state grid, to RLDC, and to the concerned Regional Entities (whose grid would be affected by it) as specified in the detailed operating procedure by NLDC/RLDC.

(5) Any prolonged outage of power system elements of any User, which is causing or likely to cause danger to the grid or sub-optimal operation of the grid shall regularly be monitored by SLDC. SLDC shall report such outages to Power System Operational Co-ordination Committee. Power System Operational Co-ordination Committee shall finalise action plan and give instructions to restore such elements in a specified time period. Maintenance of their respective power system elements shall be carried out by users, STUs and CTU in accordance with the provisions in Central Electricity Authority (Grid Standards) Regulations, 2010.

(6) All thermal generating units of 200 MW and above and all hydro units of 10 MW and above, which are synchronized with the grid, irrespective of their ownership, type and size, shall have their governors in normal operation at all times. Such generating units (except those with upto three hours pondage) shall be operated under restricted governor mode of operation. The restricted governor mode of operation shall essentially have the following features:

a. There should not be any reduction in generation in case of improvement in grid frequency below 50.2 Hz. (for example if grid frequency changes from 49.3 to 49.4 Hz. then there shall not be any reduction in generation).

   Whereas for any fall in grid frequency, generation from the unit should increase by 5% limited to 105 % of the MCR of the unit subject to machine capability.

b. Ripple filter of +/- 0.03 Hz. shall be provided so that small changes in frequency are ignored for load correction, in order to prevent governor hunting.

(7) All other generating units including the pondage upto 3 hours, Gas turbine/Combined Cycle Power Plants, wind and solar generators and Nuclear Power Stations shall be exempted from Sections 5.2 (9) ,5.2 (10), 5.2 (11) and ,5.2(12) till the Commission reviews the situation.

Provided that if a generating unit cannot be operated under restricted governor mode operation, then it shall be operated in free governor mode operation with manual intervention to operate in the manner required under restricted governor mode operation

(8) If any Generating Unit of 200 MW and above and all hydro units of 10 MW and above, is required to be operated without its governor in normal operation, the SLDC shall be immediately advised about the reason and duration of such operation. All governors shall have a droop of between 3% and 6% .

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

(10) All Generating Units of 200 MW and above and all hydro units of 10 MW and above, operating at or up to 100% of their Maximum Continuous Rating (MCR) shall normally be capable of (and shall not in any way be prevented from) instantaneously picking up to 105% and 110% of their MCR , respectively, when frequency falls suddenly. After an increase in generation as above, a Generating Unit may ramp back to the original level at a rate of about one percent (1%) per minute, in case continued operation at the increased level is not sustainable. Any Generating Unit not complying with the above requirements shall be kept in operation (synchronized with the State grid) only after obtaining the permission of SLDC. However, SLDC can make up the corresponding short fall in spinning reserve by maintaining an extra spinning reserve on the other Generating Units of the State.

(11) Provision of protections and relay settings shall be coordinated periodically throughout the State grid, as per a plan to be separately finalized by the Protection Co-ordination Committee of the STU. All users shall ensure that installation and operation of protection system shall comply with the provisions of Central Electricity Authority (Grid Standards) Regulations, 2010.

(12) All Users shall also facilitate identification, installation and commissioning of System Protection Schemes (including inter-tripping and run-back) in the power system to protect against situations such as voltage collapse and tripping, tripping of important corridors/flow-gates etc. Such schemes would be finalized by the Protection Co-ordination Committee of the STU, and shall be kept in service.

SLDC shall be promptly informed in case any of these are taken out of service along with the reason and duration of anticipated outage from service.

(13) Procedures shall be developed to recover from partial/total collapse of the grid and periodically updated in accordance with Central Electricity Authority (Grid Standards) Regulations, 2010 and with the requirements given under section 5.9. These procedures shall be followed by all the Users to ensure consistent, reliable and quick restoration.

(14) STU shall provide adequate and reliable communication facility internally and with other Generators/Distribution Licensees/Users to ensure exchange of data/information necessary to maintain reliability and security of the grid. Wherever possible, redundancy and alternate path shall be maintained for communication along important routes i.e. SLDC to STU / ALDC / DSOCC.

(15) The Users shall send information/data including Disturbance Recorder /sequential event recorder output etc., within 24 hours to SLDC for purpose of analysis of any grid disturbance/event. No Users shall block any data/information required by the SLDC for maintaining reliability and security of the grid and for analysis of an event.

5.3 FREQUENCIES AND VOLTAGE MANAGEMENT AND REACTIVE POWER PRICING

(1) Introduction

Section-5.3 describes the method by which all Users of the Transmission System shall co-operate with the Transmission Licensee in contributing towards effective control of the system frequency and managing the voltage of the Transmission System.

The Transmission Licensee's system normally operates in synchronism with the Central Synchronous Power System (in which Western Region, Eastern Region and North East Region are connected) ERLDC is the Apex Body for operation of Eastern Regional Grid. The constituents of the Eastern Region are required to follow the instructions of ERLDC for safe and secure operation of the Regional Grid. SLDC shall accordingly instruct *State* Generating Units and CGPs to regulate generation/export and hold reserves of active and reactive power, within their respective declared parameters. SLDC shall also regulate load and bilateral exchange as may be necessary to meet this objective.

Transmission System voltage levels can be affected by regional operation. High voltages generally occur during high frequency and vice versa, therefore system frequency regulation must be recognised as an important method of voltage control. The Transmission Licensee shall optimise voltage management by adjusting transformer taps to the extent available and switching of circuits/reactors and other operational steps. SLDC will instruct Generating Units and CGPs to regulate MVAr generation within their declared parameters. SLDC shall also instruct Distribution Companies to regulate demand if necessary.

(2) Objective

The objectives of this Section are as below-

(i) to define the responsibilities of all Users in contributing to frequency management.

(ii) to define the actions required enabling the Transmission Licensee to maintain Transmission System voltages and frequency within acceptable levels in accordance with IEGC, CEA guidelines, and Transmission Planning and Security Standards, as appropriate.

(3) Frequency Management

(a) (i) SLDC in co-ordination with ERLDC shall make all possible efforts to ensure that the grid frequency always remains within the 49.7 to 50.2 Hz band, the frequency range within which steam turbines conforming to the IEC specifications can safely operate. It shall however be the objective to maintain operational frequency within the limits as specified in Connection Conditions. Any frequency deviation beyond the normal range shall be jointly identified by SLDC and ERLDC and appropriate action taken.

(ii) SLDC shall always endeavour to restrict net drawal to within the Drawal Schedule whenever system frequency is below 49.5 Hz. When frequency falls below 49.0 Hz, SLDC shall explore and utilize internal generation capacity and then requisite load shedding as agreed with distribution companies, shall be carried out in the State by SLDC to curtail the over-drawal.

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

(iv) Except under an emergency, or to prevent an imminent damage to costly equipment, no User shall suddenly reduce his Generating Unit output by more than one hundred (100) MW without prior intimation to and consent of the State Load Despatch Centre, particularly when frequency is falling or is below 49.5Hz. Similarly, no User shall cause a sudden increase in its load by more than one hundred (100 MW) without prior intimation to and consent of the State Load Despatch Centre. All users shall ensure that temporary over voltage due to sudden load rejection and the maximum permissible values of voltage unbalance shall remain within limits specified under Central Electricity Authority (Grid Standards) Regulations, 2010.

(b) **Responsibilities**

SLDC shall monitor actual Drawal against scheduled Drawal and regulate internal generation/demand to maintain this schedule. Generators, CGPs and bilateral Agencies shall follow the despatch instructions issued by SLDC. Distribution companies and

bilateral Agencies shall co-operate with SLDC in managing load on instruction from SLDC as required.

(c) **Falling frequency**

(i) Whenever system frequency is below 49.8 Hz, Gridco through SLDC shall endeavour to restrict its net drawal from the regional grid within its Drawal Schedules. The generation at all SGS /CGPs (except those on peaking duty) shall be maximized, at least up to the level which can be sustained, without waiting for an advise from SLDC When the system frequency is below 49.0 Hz. requisite load shedding shall be carried out by SLDC by instructing distribution companies as per prearranged schedules.

(ii) All Users shall provide automatic under-frequency and df/dt 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 finalised by the Protection Co-ordination Committee of the STU, and shall ensure its effective application to prevent cascade tripping of Generating Units in case of any contingency. All Users shall ensure that the above under frequency and df/dt load shedding/islanding schemes are functional. However, in case of extreme contingencies, these relays may be temporarily kept out of service with prior consent of SLDC, which shall independently check and keep a record of its findings.

(iii) Protection Co-ordination Committee of the STU shall carry out periodic inspection of the under frequency relays and maintain proper records of the inspection. Protection Co-ordination Committee of the STU shall decide and intimate the action required by distribution licensee and STUs to get required load relief from Under Frequency and Df/Dt relays. All distribution licensee and STUs shall abide by these decisions. SLDC shall keep a comparative record of expected load relief and actual load relief obtained in Real time system operation. A monthly report on expected load relief vis-a-vis actual load relief shall be sent to the Protection Co-ordination Committee of the STU and the OERC.

(d) **Rising frequency**

Under rising frequency conditions, SLDC shall take appropriate action to issue instructions to generators/ CGPs, in co-ordination with ERLDC, to arrest the rising frequency and restore frequency within normal range.

When the frequency is higher than 50.2 Hz, the actual net injection shall not exceed the scheduled despatch for that block**.** Also, while the frequency is above 50.2 Hz, the Generating Companies may (at their discretion) back down without waiting for an advice from SLDC to restrict the frequency rise.

(4) Frequency Linked Pricing Operation

All Users have to operate the system according to the standing frequency linked load despatch guidelines as specified at Clause 6.4 of this OGC.

(5) Voltage Management

(i) The Transmission Licensee shall carry out load flow studies from time to time to predict where voltage problems may be encountered and to identify appropriate measures to ensure that voltages remain within the defined limits. On the basis of these studies SLDC shall instruct generators and CGPs to maintain specified voltage levels at interconnecting points.

(ii) The Transmission Licensee shall co-ordinate with the distribution companies to determine voltage levels at the External Inter Connection Points with distribution companies. Distribution companies shall participate in voltage management by regulating their Drawal as may be required. The Distribution Company shall endeavour to minimize the VAr drawal at an External Inter Connection Point.

(iii) SLDC shall continuously monitor 400/220/132 kV voltage levels at strategic sub-stations. SLDC in consultation with RLDC may issue directions for Switching in/out of all 400 kV bus and line Reactors throughout the grid / tap changing on all 400/220 Kv ICTs shall also be done as per RLDC conveyed through SLDC's. In case of persistent voltage problem SLDC will interact with RLDC for remedial measure.

(iv) SLDC shall, in co-ordination with ERLDC, regulate voltage levels so that there is minimal reactive drawal from regional Transmission System.

(v) In general, the Beneficiaries shall endeavour to minimize the VAr drawal at an interchange point when the voltage at that point is below 95% of rated, and shall not return VAr when the voltage is above 105%. Auto Transformer taps at the respective drawal points may be changed to control the VAr interchange as per a Beneficiaries' request to the SLDC, but only at reasonable intervals.

(vi) The SLDC shall take appropriate measures to control Transmission System voltages, which may include but not be limited to transformer tap changing and use of MVAr reserves with Generating Units and CGPs within technical limits agreed to between the Transmission Licensee and Generating Units/CGPs.

(vii) Generators and CGPs shall inform SLDC of their reactive reserve capability promptly on request.

(viii) Generators shall make available to SLDC the up-to-date capability curves for all Generating Units, as detailed in Chapter-4, indicating any restrictions, to allow accurate system studies and effective operation of the Transmission System. CGPs shall similarly furnish the net reactive capability that will be available for export to/ import from Transmission System.

(ix) All Generating Units shall normally have their Automatic Voltage Regulators (AVRs) in operation, with appropriate settings. In particular, if a Generating Unit of over fifty (50) MW size is required to be operated without its AVR in service, the SLDC shall be immediately intimated about the reason and duration, and its permission obtained. Power System Stabilizers (PSS) in AVRs of Generating

Units (wherever provided), shall be got properly tuned by the respective Generating Unit owner as per a plan prepared for the purpose by the STU from time to time. STU will be allowed to carry out checking of PSS and further tuning it, wherever considered necessary.

(x) All Users shall make all possible efforts to ensure that the grid voltage always remains within the following Operating Range.

VOLTAGE – (KV rms)

Nominal	Maximum	Minimum
765	800	728
400	420	380
220	245	198
132	145	122
110	121	99
66	72	60
33	36	30

(xi) All Users shall also facilitate identification, installation and commissioning of system protection schemes in the Power System to protect against situations such as voltage collapse and cascading. Such schemes would be finalized by the PCC of STU.

(6) Reactive Power Pricing Policy

(i) Reactive power compensation should ideally be provided locally, by generating reactive power as close to the reactive power consumption as possible. The Beneficiaries are therefore expected to provide local VAr compensation/ generation such that they do not draw VArs from the EHV grid, particularly under low-voltage condition. However, considering the present limitations, this is not being insisted upon. Instead, to discourage VAr drawals by Beneficiaries, VAr exchanges with State Transmission System shall be priced as follows:

- The Beneficiary pays for VAr drawal when voltage at the metering point is below 97%

- The Beneficiary gets paid for VAr return when voltage is below 97%

- The Beneficiary gets paid for VAr drawal when voltage is above 103%

- The Beneficiary pays for VAr return when voltage is above 103%

Provided that there should be no charge /payment for VAr drawal / return by a Beneficiary on its own line emanating directly from a SGS.

(ii) The charge/payment for VArs, shall be at a nominal paise / kVArh rate as may be specified by OERC from time to time, and will be between the Beneficiary and the State pool account for VAr interchanges.

(iii) Notwithstanding the above, SLDC may direct a Beneficiary to curtail its VAr drawal / injection in case the security of grid or safety of any equipment is endangered.

(iv) The SGS shall generate/absorb reactive power as per instructions of SLDC, within capability limits of the respective Generating Units, that is without sacrificing on the active generation required at that time. No payments shall be made to the generating companies for such VAr generation/absorption.

(v) VAr exchange directly between two Beneficiaries on the interconnecting lines owned by them (singly or jointly) generally address or cause a local voltage problem, and generally do not have an impact on the voltage profile of the State grid. Accordingly, the management/control and commercial handling of the VAr exchanges on such lines shall be as per following provisions, on case-by-case basis:

(a) The two concerned Beneficiaries may mutually agree not to have any charge / payment for VAr exchanges between them on an interconnecting line.

(b) The two concerned Beneficiaries may mutually agree to adopt a payment rate/scheme for VAr exchanges between them identical to or at variance from that specified by OERC for VAr exchanges with STS. If the agreed scheme requires any additional metering, the same shall be arranged by the concerned Beneficiaries.

(c) In case of a disagreement between the concerned Beneficiaries (e.g. one party wanting to have the charge/payment for VAr exchanges, and the other party refusing to have the scheme), the scheme as specified in Annexure-I to Chapter-5 shall be applied. The per KVArh rate shall be as specified by OERC for VAr exchanges with State Transmission System.

(d) The computation and payments for such VAr exchanges shall be affected as mutually agreed between the two Beneficiaries.

(7) Special requirements for Solar/ wind generators

(i) SLDC shall make all efforts to evacuate the available solar and wind power and treat as a must-run station. However, System operator may instruct the solar /wind generator to back down generation on consideration of grid security or safety of any equipment or personnel is endangered and Solar/ wind generator shall comply with the same. For this, Data Acquisition System facility shall be provided for transfer of information to concerned SLDC

(a) SLDC may direct a wind farm to curtail its VAr drawl/injection in case the security of grid or safety of any equipment or personnel is endangered.

(b) During the wind generator start-up, the wind generator shall ensure that the reactive power drawl (inrush currents incase of induction generators) shall not affect the grid performance.

(8) General

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

5.4 DEMAND ESTIMATION FOR OPERATIONAL PURPOSES

(1) Introduction

(a) This Section describes the procedures/responsibilities of the SLDC for demand estimation for both Active Power and Reactive Power.

(b) The demand estimation is to be done on daily/weekly/monthly/ yearly basis for current year for load - generation balance planning. The SLDC shall carry out system studies for operational planning purposes using this demand estimate.
(Please refer Annexure II, III, IV and V to Chapter-5)

(c) SLDC shall carry out its own demand estimation (MW,MVA and MWh) from the historical data and weather forecast data from time to time. All distribution licensees and other concerned persons shall provide relevant data and other information as required by SLDC for demand estimate.

(d) While the demand estimation for operational purposes is to be done on a daily/ weekly/monthly basis initially, mechanisms and facilities at SLDC shall be created at the earliest to facilitate on-line estimation for daily operational use for each 15 minutes block.

(e) SLDC shall take into account the wind energy forecasting to meet the active and reactive power requirement.

(2) Objective

(a) The objective of this procedure is to enable the SLDC to estimate their demand over a particular period.

(b) The demand estimates are to enable the SLDC to conduct system studies for Operational Planning purposes.

(3) Procedure

The SLDC shall develop methodologies/mechanisms for daily / weekly / monthly / yearly demand estimation (MW, MVAr and MWh) for operational purposes. Based on this demand estimate and the estimated availability from different sources, SLDC shall plan demand management measures like load shedding, power cuts, etc. and shall ensure that the same is implemented by the distribution licensees. All distribution licensees shall abide by the demand management measures of the SLDCs and shall also maintain historical database for demand estimation.

(4) Demand Estimation

(a) Demand estimation is necessary both in the long time scale to ensure adequate system plant margins and ratings and in the shorter time scale to assist with frequency control (see Scheduling and Despatch Code Chapter).

(b) Distribution companies and other Agencies involved in bilateral exchanges shall provide to the SLDC their estimates of demand/export for Active power (MW), Reactive power (MVAr) and Energy consumption (MU) at each connection / External Interconnection Point on daily / weekly / monthly basis (Formats as per Annexures II, III, IV and V respectively). The distribution companies shall intimate to the SLDC the methodology used in producing their forecasts.

(c) The SLDC shall use this data

(i) to assist in determination of the generation schedule for next day;
(ii) to determine the most onerous conditions affecting constraints and voltage performance for next week;
(iii) to check outage Plan viability for peak and Lean Periods for next month.

(d) (i) The data shall be in the form of 96 blocks (15 minutes) period averaged demand figure for that day, the weekly / monthly data shall be in the form of 24 hourly averaged demand figures for that week/month and yearly data shall be in the form of month wise energy requirement for the year. All the above data shall be in respect of each inter connection point.

(ii) The demand /export estimates provided by the distribution companies and other Users involved in bilateral exchanges shall be updated as necessary and sent each month to the SLDC 15 days ahead on same daily / weekly / monthly basis.

(iv) The demand estimates shall be further updated and sent to SLDC in accordance with the provision of Chapter- 6, Scheduling and Despatch.

(v) The SLDC shall make its own demand forecast using hourly demand summation of each sub-station and CGP import / export figures provided under Chapter-7 or by using suitable computer program, to compare with demand estimates provided by Users.

(v) SLDC shall notify a Contact Person who shall be responsible for day ahead demand forecast. The official and residential telephone numbers of the Contact Person shall be intimated to all the distribution companies. Similarly all the distribution companies shall notify the Contact Person with telephone numbers and intimate SLDC. In case of change of Contact Person, it should be intimated to SLDC and vice versa.

(vi) Distribution companies shall provide to SLDC estimates of load that may be shed, when required, in discrete blocks with the details of the arrangements of such load shedding.

(vii) While the demand estimation for operational purposes is to be done on a daily/weekly/monthly basis initially, mechanisms and facilities at SLDC shall be created at the earliest to facilitate on-line estimation for daily operational use.

(viii) All data shall be collected in accordance with procedures agreed between the SLDC and each User.

(ix) SLDC shall maintain a database of State demand on a fifteen minutes basis.

5.5 DEMAND MANAGEMENT

(1) Introduction

This Section is concerned with the provisions to be made by SLDC to effect a reduction of demand in the event of insufficient generating capacity, and inadequate transfers from external interconnections to meet demand, or in the event of breakdown or congestion in intra-state or inter-state transmission system or other operating problems (such as frequency, voltage levels beyond normal operating limit, or thermal overloads etc. or overdrawl of power by the licensee and open access consumers beyond the limits mentioned in UI regulation) on any part of the grid.

(2) Manual Demand Disconnection

(a) As mentioned elsewhere, the Distribution Licensees and other Users shall endeavour to restrict their net drawal from the grid to within their respective Drawal Schedules whenever the system frequency is below 49.7 Hz. The SLDC/ distribution licensee and bulk consumer shall ensure that requisite load shedding is carried out in its control area so that there is no overdrawl when frequency is 49.5 Hz. or below.

(b) Each User/STU/SLDC shall formulate contingency procedures and make arrangements that will enable demand disconnection to take place, as instructed by the SLDC, under normal and/or contingent conditions. These contingency procedures and arrangements shall regularly be / updated by User/STU and monitored by SLDC. SLDC may direct any User/STU to modify the above procedures/arrangement, if required, in the interest of grid security and the concerned User/STU shall abide by these directions.

(c) The SLDC through STU/Distribution Licensees shall also formulate and implement state-of-the-art demand management schemes for automatic demand management like rotational load shedding, demand response (which may include lower tariff for interruptible loads) etc. to reduce overdrawl in order to comply para 5.5.2 (a) . A Report detailing the scheme and periodic reports on progress of implementation of the schemes shall be sent to the Commission by the concerned SLDC.

(d) In order to maintain the frequency within the stipulated band and maintaining the network security, the interruptible loads shall be arranged in four groups of loads, for scheduled power cuts/load shedding, loads for unscheduled load shedding, loads to be shed through under frequency relays/ df/dt relays and loads to be shed under any System Protection Scheme. These loads shall be grouped in such a manner , that there is no overlapping between different Groups of loads. In case of certain contingencies and/or threat to system security, the SLDC may direct any Users/distribution licensee or bulk consumer connected to the GRID to decrease its drawal by a certain quantum. Such directions shall immediately be acted upon. Concerned User shall send compliance report immediately after compliance of these directions to SLDC.

(e) To comply with the direction of RLDC, SLDC may direct any User/distribution licensee/bulk consumer connected to the STU to curtail drawal from grid. SLDC shall monitor the action taken by the concerned entity and ensure the reduction of drawal from the grid.

(f) SLDC shall devise standard, instantaneous, message formats in order to give directions in case of contingencies and /or threat to the system security to reduce overdrawl by the users at different overdrawal conditions depending upon the severity of the overdrawal. The SLDC shall ensure immediate compliance with these directions.

(g) All Users, distribution licensee or bulk consumer shall comply with direction of SLDC and carry out requisite load shedding or backing down of generation in case of congestion in transmission system to ensure safety and reliability of the system. The procedure for application of measures to relieve congestion in real time as well as provisions of withdrawl of congestion shall be in accordance with Central Electricity Regulatory Commission (Measures to relieve congestion in real time operation) Regulations, 2009.

(h) The measures taken to reduce the Users drawal from the grid shall not be withdrawn as long as the frequency/voltage remains at a low level or the congestion continues, unless specifically permitted by the SLDC.

5.6 PERIODIC REPORTS

(1) Weekly Reports

A weekly report shall be issued by SLDC to all Users, which shall cover the performance of the State grid for the previous week. Such weekly report shall also be available on the website of the SLDC for at least 12 weeks. The weekly report shall contain the following:

(a) Frequency profile
(b) Voltage profile of important substations and sub-stations normally having low /high voltages
(c) Major Generation and Transmission Outages
(d) Transmission Constraints

(e) Instances of persistent/significant non-compliance of OGC.
(f) Instances of congestion in transmission system
(g) Instances of inordinate delays in restoration of transmission elements and generating units
(h) Non-compliance of instructions of SLDC by User/distribution licenses / bulk consumers, to curtail drawal resulting in non-compliance of IEGC/OGC

(2) Other Reports

(a) The SLDC shall prepare a quarterly report and shall issue to all the Users, which shall bring out the system constraints, reasons for not meeting the requirements, if any, of security standards and quality of service, along with details of various actions taken by different Users, and the Users responsible for causing the constraints.

(b) The SLDC shall also provide information/report, which can be called for by Users in the interest of smooth operation of the State Transmission System.

5.7 OPERATIONAL LIAISON

(1) Introduction

(a) 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 Transmission System
- The State Generating Stations
- The system of an User

The above generally relates to notifying of what is expected to happen or what has happened and not the reasons why.

(b) The operational liaison function is a mandatory built-in hierarchical function of the SLDC and Users, to facilitate quick transfer of information to operational staff. It will correlate the required inputs for optimisation of decision-making and actions.

(2) Procedure for Operational Liaison

(a) **Operations and events on the State Grid**

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

(ii) Immediately following an event on State grid, the SLDC will inform each User, whose system may, or will, experience an operational effect following the event, and give details of what has happened in the event but not the reasons why.

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

(i) Before any operation is carried out on a User's system, the User will inform the SLDC, in case the State grid may, or will, experience an operational effect, and give details of the operation to be carried out.

(ii) Immediately following an event on an User's system, the User will inform the SLDC, in case the State Grid may, or will, experience an operational effect following the event, and give details of what has happened in the event but not the reasons why.

(iii) Forced outages of important network elements in the grid shall be closely monitored by Power System Operational Co-ordination Committee. Power System Operational Co-ordination Committee shall send a monthly report of prolonged outage of generators or transmission facilities to the Commission.

5.8 OUTAGE PLANNING

(1) Introduction

This Section describes the process by which the Transmission Licensee carries out the planning of Transmission System outages, including interface co-ordination with Users.

(a) This also sets out the procedure for preparation of outage schedule for the element of the State grid in a coordinated 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).

(b) The generation out put and Transmission System should be adequate after taking into account the outages to achieve the Security Standards.

(c) Annual outage plan shall be prepared in advance for the financial year by the SLDC and reviewed during the year on quarterly and monthly basis.

If any deviation is required the same shall be with prior permission of SLDC. The outage planning of run-of-the-river hydro plant, wind and solar power plant and its associated evacuation network shall be planned to extract maximum power from these renewable sources of energy. Outage of wind generator should be planned during lean wind season, outage of solar, if required during the rainy season and outage of run-of-the river hydro power plant in the lean water season.

(2) Objective

(a) To produce a coordinated generation outage programme for the State Grid considering all the available resources and taking into account transmission constraints, as well as, irrigational requirements.

(b) To minimise surplus or deficits, if any, in the system requirement of power and energy and help operate system within Security Standards.

(c) To optimise 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 Distribution Licensees /STU systems and maintaining system security standards.

(3) Scope

This Section is applicable to all Users including SLDC, Distribution Licensees, STU, other transmission Licensees and SGS.

(4) Outage planning Process

(a) The SLDC shall be responsible for analysing the outage schedule given by all Users, preparing a draft annual outage schedule and finalization of the annual outage plan for the following financial year by 31st January of each year.

(b) All Distribution Licensees / STU, SGS shall provide SLDC their proposed outage programmes in writing for the next financial year by 1st August of 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.

(c) SLDC shall then come out with a draft outage programme for the next financial year before 30th November of 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 requirement shall be ensured while finalising outage programmes.

(d) SLDC shall inform this draft outage programme to ERPC in writing by 30th November for each financial year.

(e) ERPC will than come out with a draft outage programme for the next financial year by 31st December of each year for the regional grid.

(f) The final outage plan shall be intimated to all regional constituents and RLDC for implementation latest by 31st January of each year as mutually decided in REB/RPC forum.

(g) SLDC shall interact with all Users as necessary to review and optimise the draft plan, agree to any changes and produce an acceptable co-ordinated generation and transmission outage plan by 1st February each year.

(h) SLDC shall release the finally agreed transmission outage plan, which takes account of regional and User requirements, to all Users by 1st March each year.

(i) The above annual outage plan shall be reviewed by SLDC on quarterly and monthly basis in consultation with ERLDC and Users who shall be informed by SLDC any proposed changes. SLDC shall review the monthly outage plan,

generation schedule and other operational aspects related to system operation in the monthly Power System Operational Co-ordination committee meeting to be held by SLDC.

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

(k) SLDC is authorized to defer the planned outage in case of any of the following, taking into account the statutory requirements:

- Major grid disturbances (Total black out in State)
- System isolation
- Partial Black out in the State.
- Any other event in the system that may have an adverse impact on the system security by the proposed outage.

(l) The detailed generation and transmission outage programmes shall be based on the latest annual outage plan (with all adjustments made to date).

(m) Users' requests for additional Outages will be considered by SLDC and accommodated to the extent possible.

(n) SLDC shall inform Users promptly of any changes that affect them.

(o) Each STU/SGS/Distribution Licensee shall obtain the final approval from SLDC prior to availing an outage.

(5) Release of Circuit and Generation Units included in Outage Plan.

Notwithstanding provision in any approved outage plan, no cross boundary circuits or Generating Unit of a generator shall be removed from service without specific release from SLDC. This restriction shall not be applicable to individual Generating Unit of a CGP.

Once an outage has commenced, if any delay in restoration is apprehended, SLDC or User concerned shall inform the other party promptly together with revised estimation of restoration time.

(6) Data Requirements

Users shall provide SLDC with data for this Section as specified in the Data Registration Chapter- 12 of this OGC.

5.9 RECOVERY PROCEDURES

(1) Detailed plans and procedures for restoration of the State grid under partial/total blackout shall be developed by SLDC in consultation with all Users and shall be reviewed / updated annually.

(2) Detailed plans and procedures for restoration after partial / total blackout of Transmission System will be finalised by the STU in coordination with the SLDC. The procedure will be reviewed, confirmed and/or revised once every subsequent year. Mock trial runs of the procedure for different sub-systems shall be carried out by the STU at least once every six months under intimation to the SLDC.

(3) List of Generating Stations with Black Start facility, synchronizing points and essential loads to be restored on priority, shall be prepared and be available with SLDC.

(4) The SLDC is authorized during the restoration process following a black out; to operate with reduced security standards for voltage and frequency as necessary in order to achieve the fastest possible recovery of the grid.

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

5.10 EVENT INFORMATION

(1) Introduction

This Section deals with reporting procedures in writing of reportable events in the system to all Users/STU and SLDC. The reporting procedure shall be in accordance with the relevant CEA Regulations.

(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 /events.

(3) Scope

This Section covers all Users and SLDC.

(4) Responsibility

(a) The SLDC shall be responsible for reporting events to the Users.

(b) SLDC shall be responsible for collection and reporting of all necessary data to Users for monitoring, reporting and event analysis.

(5) Reportable Events

(a) Any of the following events require reporting by SLDC / STU/ Users:
- (i) Violation of security standards.
- (ii) Grid indiscipline.
- (iii) Non-compliance of SLDC's instructions.
- (iv) System islanding/system split

(v) State black out/partial system black out
(vi) Protection failure on any element of the State systems.
(viii) Power System instability
(ix) Tripping of any element of the Regional grid.
(x) Sudden load rejection by any User as a reportable event

(b) Typical examples of reportable incidents that could affect the state Transmission System are the following:

(i) Exceptionally high/low system voltage or frequency.
(ii) Serious equipment problem, e.g. major circuit, transformer or bus bar.
(iii) Loss of major Generating Unit.
(iv) Transmission System breakaway or Black Start.
(v) Major fire incidents.
(vi) Equipment and transmission line overload.
(vii) Excessive Drawal deviations.
(viii) Minor equipment alarms.

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

(6) Reporting Procedure

(a) All reportable incidents occurring in lines and equipment of 11 kV and above at grid sub-stations shall promptly be reported orally by the User whose equipment has experienced the incident (The Reporting User) to any other significantly affected Users and to SLDC.

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

(c) If the reporting incident cannot be classed as minor then the Reporting User shall submit an initial written report within two hours of asking for a written report by SLDC. This has to be further followed up by the submission of a comprehensive report within 48 hours of the submission of the initial written report.
In other cases the Reporting User shall submit a report within 5 (five) working days to SLDC.

(d) In the case of an event occurring in EHV system and generating equipment which was initially reported by STU / Transmission Licensee/ State Generator, SLDC will give a written report to ERLDC as stipulated in IEGC.

(e) 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.

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

(7) Form of Written Reports:

A written report shall be sent to SLDC, and will confirm the oral notification together with the following details of the event:

- Time and date of event
- Location
- Plant and/or Equipment directly involved
- Description and cause of event
- Antecedent conditions
- Demand and/or Generation (in MW) interrupted and duration of interruption
- All Relevant system data including copies of records of all recording instruments including Disturbance Recorder, Event Logger, DAS etc.
- Sequence of tripping with time.
- Details of Relay Flags.
- Remedial measures.
- Estimate of time to return to service.
- Name of originator.

The standard reporting form other than for accidents shall be as per the Annexure-VI to Chapter- 5 of the OGC.

(8) Major Failure

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

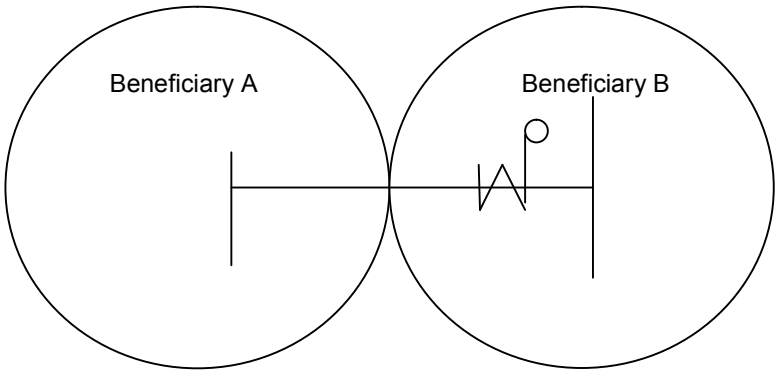
(9) Accident Reporting

Reporting of accidents shall be in accordance with the IE Rules, 1956, Rule 44-A read with CEA (Measures relating to Safety and Electric Supply) Regulation, 2010. In both fatal and non-fatal accidents, the report shall be sent to the Electrical Inspector in the prescribed form.

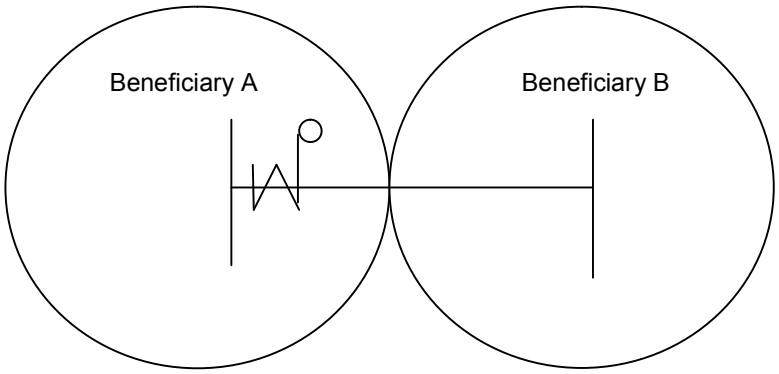
Annexure-I
[Refer section 5.3(6)]

PAYMENT FOR REACTIVE ENERGY EXCHANGES ON BENEFICIARY OWNED LINES

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



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



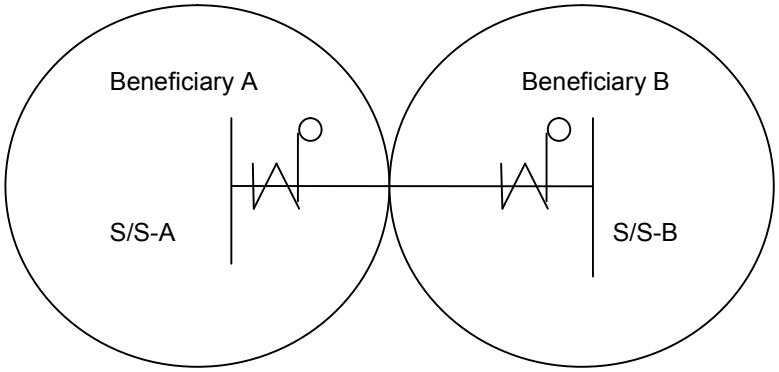
Beneficiary -B pays to Beneficiary -A for

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

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

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

Case – 3: Interconnecting line is jointly owned by Beneficiary-A and–B.
Metering points: Substations of Beneficiary-A and Beneficiary-B



Net VArh exported from S/S-A, while voltage < 97% = X_1

Net VArh exported from S/S-A, while voltage > 103% = X_2

Net VArh imported at S/S-B, while voltage < 97% = X_3

Net VArh imported at S/S-B, while voltage > 103% = X_4

(i) Beneficiary-B pays to Beneficiary-A for X_1 or X_3, whichever is smaller in magnitude, and

(ii) Beneficiary-A pays to Beneficiary-B for X_2 or X_4, whichever is smaller in magnitude.

Note:

1. Net VArh and net payment may be positive or negative.

2. In case X_1 is positive and X_3 is negative, or vice-versa, there would be no payment under (i) above.

3. In case X_2 is positive and X_4 is negative, or vice-versa, there would be no payment under(ii) above.

ANNEXURE-II TO CHAPTER-5

Day ahead forecast of demand at inter-connection points

{Ref- Section 5.4(1) and (4)}

To be furnished by 11:00 Hrs of current day

Name of The Distribution Company :- For Date:-

Hour/Block	Day>	Name of S/S	Name of S/S	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	Name of S/S	Total
1	MW																					
	MVAr																					
2	MW																					
	MVAr																					
3	MW																					
	MVAr																					
4	MW																					
	MVAr																					
5	MW																					
	MVAr																					
6	MW																					
	MVAr																					
7	MW																					
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22	MW																					
	MVAr																					
23	MW																					
	MVAr																					
24	MW																					
	MVAr																					
.	MW																					
	MVAr																					
96	MW																					
	MVAr																					
Total (MU)																						

Signature of Authorised signatory
of the Licensee

ANNEXURE-III TO CHAPTER-5

Weekly a head forecast of demand at inter connection points for the next week (Monday to Sunday)

To be furnished by Friday of each week

Name of The Distribution Company :- {Ref-Section 5.4(1) and (4)}

Sl. NO.	Name of S/S ----> Hr		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
1		MW																									
		MVAr																									
2		MW																									
		MVAr																									
3		MW																									
		MVAr																									
4		MW																									
		MVAr																									
5		MW																									
		MVAr																									
6		MW																									
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9		MW																									
		MVAr																									
		MW																									
		MVAr																									
		MW																									
		MVAr																									
N		MW																									
		MVAr																									

Signature of Authorised signatory of
the Licensee

ANNEXURE-IV TO CHAPTER-5

Month ahead forecast of demand at inter-connection points for the next month

To be furnished by 15th of current month

Name of The Distribution Company :- {Ref-Section 5.4(1) and (4)}

Sl. NO.	Name of S/S ----> Hr		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
1		MW																									
		MVAr																									
2		MW																									
		MVAr																									
3		MW																									
		MVAr																									
4		MW																									
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7		MW																									
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8		MW																									
		MVAr																									
9		MW																									
		MVAr																									
		MW																									
		MVAr																									
N		MW																									
		MVAr																									
Total		MW																									
		MVAr																									

Signature of Authorised signatory of
the Licensee

ANNEXURE-V TO CHAPTER-5

Yearly (Month wise) requirement of Energy at inter-connection points for the next Financial Year

To be furnished by 31st December of each year {Ref-Section 5.4(1) and (4)}

Name of The Distribution Company :- For the Year- All Figures in MU

Sl. NO.	Name of S/S	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Total
1														
2														
3														
4														
5														
6														
7														
N														
Total														

Signature of Authorised signatory of
the Licensee

Annexure VI to Chapter-5
[Ref: Regulation 5.9(7)]

INCIDENT REPORTING

FIRST REPORT _____ **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 to service :
12. Cause of incident :
13. Any other relevant information :
14. Recommendations for future improvement/ repeat incident :
15. Name of the Organisation :

CHAPTER- 6

SCHEDULING AND DESPATCH CODE

6.1 INTRODUCTION

This Chapter specifies the procedure to be adopted for the scheduling and despatch of Generating Units to meet demand and drawal allocation requirements.

It further sets down the procedures to be followed by Users so that the SLDC can meet its daily Drawal Schedule whilst ensuring that reactive power drawals/ returns are minimised.

This Chapter sets out the

a) Demarcation of responsibilities between Various Users and SLDC in scheduling and despatch

b) Procedure for scheduling and despatch

c) Complementary Commercial Mechanism (Annexure-1 to Chapter 6)

6.2 OBJECTIVE

This code deals with the procedures to be adopted for scheduling of the State Generating Stations (SGS) including ISGS so far as injection to grid and net Drawals of concerned Users on a daily basis with the modality of the flow of information between the SGS / SLDC/Beneficiaries of the State grid. The procedure for submission of capability declaration by each SGS and submission of Drawal Schedule by each Beneficiary is intended to enable SLDC to prepare the Despatch Schedule for each SGS and Drawal Schedule for each Beneficiary. It also provides methodology of issuing real time despatch/ drawal instructions and rescheduling, if required, to SGS and Beneficiaries along with the commercial arrangement for the deviations from schedules, as well as, mechanism for reactive power pricing. This code also provides the methodology for rescheduling of wind and solar energy on three (3) hourly basis and the methodology of compensating the wind and solar energy rich State for dealing with the variable generation through a Renewable Regulatory charge. For this, appropriate meters and Data Acquisition System facility shall be provided for accounting of UI charges and transfer of information to concerned SLDC and RLDC. The provisions contained in this chapter are without prejudice to the powers conferred on SLDC under section 32 and 33 of the Act.

6.3 SCOPE

This Section will be applicable to SLDC, SGS, IPPs, Distribution Licensees /STUs and other Beneficiaries in the State grid including CGPs and Open Access Customers.

6.4 DEMARCATION OF RESPONSIBILITIES

(1) (a) The State Load Despatch Centre is responsible for coordinating the scheduling of a generating station, within the control area. IPPs of Odisha who have not tied up their capacity on long term basis to the outside state and sale a

part of their generation, to be under SLDC Scheduling Procedure. The SLDC shall also be responsible for such generating stations for (1) real-time monitoring of the station's operation, (2) checking that there is no gaming (gaming is an intentional mis-declaration of a parameter related to commercial mechanism in vogue, in order to make an undue commercial gain) in its availability declaration, (3) revision of availability declaration and injection schedule,(4) switching instructions,(5) metering and energy accounting, (6) issuance of UI accounts within the control area,(7) collections/disbursement of UI payments, (8) outage planning etc.

(b) The following generating stations shall come under the STS control area and hence SLDC shall coordinate the scheduling of the following generating stations:
(i) The Central Generating stations where full share is allocated to the state irrespective of its connectivity to ISTS/STS.
(ii) If a generating station is connected only to the state Transmission network.
(iii) If a generating station is connected both to ISTS and the State network and the State has more than 50% share of power.
(iv) If an IPP has not tied up its full capacity under long term PPA with more than two states and selling power on merchant basis irrespective of its connectivity to ISTS/STS.

(2) The Regional grids shall be operated as loose power pools (with decentralized scheduling and despatch), in which the State shall have full operational autonomy, and SLDC shall have the total responsibility as per following guidelines for (i) scheduling / despatching State's own generation (including generation of its embedded licensees), (ii) regulating the demand of its customers, (iii) scheduling its drawal from the ISGS (within its share in the respective plant's expected capability), (iv) arranging any bilateral interchanges, and (v) regulating its net drawal from the regional grid.

(3) The system of the State shall be treated and operated as a notional control area. The algebraic summation of scheduled drawal from ISGS/SGS/IPP/CGP/IPP selling power on merchant basis and any bilateral inter-change shall provide the Drawal Schedule of each Discom, and this shall be determined in advance on day-ahead basis. While the Discoms would generally be expected to regulate its generation and/or consumers' load so as to maintain its actual drawal from the regional grid close to the above schedule. Deviation, if any, from the drawl schedule, shall be within the limits specified by the Central Commission in UI Regulations and it shall not cause system parameters to deteriorate beyond permissible limits and shall not lead to unacceptable line loading. Such deviation from net drawal schedule shall be priced through the Unscheduled Interchange (UI) mechanism.

(4) The above flexibility has been proposed in view of the fact that all Discoms does not have all requisite facilities for minute-to-minute on-line regulation of the actual net drawal from the State grid. Deviations from net Drawal Schedule are

however, to be appropriately priced through the Unscheduled Interchange (UI) mechanism.

(5) The SLDC, distribution licensees shall always endeavour to restrict the net drawl from the grid to within the drawl schedules, whenever the system frequency is below 49.8 Hz. The concerned distribution licensee, user, SLDC shall ensure that their automatic demand management scheme acts to ensure that there is no over-drawal when frequency is 49.7 Hz or below. If the automatic demand management scheme has not yet been commissioned, then action has to be taken as per manual demand management scheme to ensure zero over-drawal when frequency is 49.7 Hz or below.

(6) The SLDC/STUs/ Distribution Licensees shall regularly carry out the necessary exercises regarding short-term and long-term demand estimation for the State grid, to enable them to plan in advance as to how they would meet their consumers' load without overdrawing from the grid.

(7) The SGS/IPP/CGP /IPP selling power on merchant basis shall be responsible for power generation / injection generally according to the daily schedules advised to them by the SLDC on the basis of the contracts/ requisitions received from the Distribution licensees/LTOA consumers and beneficiaries, and for proper operation and maintenance of their generating stations, such that these stations achieve the best possible long-term availability and economy.

(8) While the SGS, IPP, IPP selling power on merchant basis and CGP would normally be expected to generate power according to the daily schedules advised to them. The SGS, IPP, IPP selling power on merchant basis and CGP may also deviate from the given schedules within the limits specified in the CERC UI Regulations of CERC, depending on the plant and system conditions. In particular, they would be allowed/encouraged to generate beyond the given schedule under deficit conditions as long as such deviations do not cause system parameters to deteriorate beyond permissible limits and/or do not lead to unacceptable line loading. Deviations, if any, from the Ex-power Plant generation injection schedules shall, however, be appropriately priced in accordance with UI Regulations. In addition, deviations, from schedules causing congestion, shall also be priced in accordance with the Congestion Charge Regulations of CERC.

(9) Provided that when the frequency is higher than 50.2 Hz, the actual net injection shall not exceed the scheduled for that time block. Also, while the frequency is above 50.2 Hz, the SGS/IPP/CGP may (at their discretion) back down without waiting for advice from SLDC to restrict the frequency rise. When the frequency falls below 49.8 Hz, the generation at all SGS/ISGS (except those on peaking duty) shall be maximized, at least up to the level to which can be sustained, without waiting for advice from SLDC subject to the condition that such increase does not lead to unacceptable line loading or system parameters to deteriorate beyond permissible limit.

(10) However, notwithstanding the above, the SLDC may direct the Distribution Licensees / Trading Licensees / Bulk Consumers/SGS/CGP/IPP to

increase/decrease their drawal/generation in case of contingencies e.g. overloading of lines/transformers, abnormal voltages and threat to system security. Such directions shall immediately be acted upon. In case the situation does not call for very urgent action, and SLDC has some time for analysis, it shall be checked whether the situation has arisen due to deviations from schedules, or due to any power flows pursuant to short-term Open Access. These shall be got terminated first in above sequence, before an action, which would affect the scheduled supplies to the Long Term Customers is initiated in accordance with Orissa Electricity Regulatory Commission (Terms and Conditions for Open Access) Regulation, 2005, amendment time to time.

(11) For all outages of generation and Transmission System, which may have an effect on the State grid, all Users shall cooperate with each other and coordinate their actions through Power System Operational Coordination Committee of the SLDC for outages foreseen sufficiently in advance and through SLDC (in all other cases), as per procedures finalized separately by this Committee. In particular, outages requiring restriction of ISGS/SGS/CGP/ IPP selling power on merchant basis/ IPP generation and/or restriction of ISGS share which a Beneficiary can receive (and which may have a commercial implication) shall be planned carefully to achieve the best optimisation.

(12) All ABT Users should abide by the concept of frequency-linked load despatch and pricing of deviations from schedule, i.e., unscheduled interchanges. All Generating Units and the licensees should normally be operated according to the standing frequency-linked load despatch guidelines issued by the RLDC, to the extent possible, unless otherwise advised by the RLDC/SLDC.

(13) The SGS/IPP/IPP selling power on merchant basis/CGP shall make an advance declaration of ex-power plant MW and MWh capabilities foreseen for the next day, i.e., from 0000 hrs to 2400 hrs. During fuel shortage condition, in case of thermal stations, they may specify minimum MW, maximum MW, MWh capability and declaration of fuel shortage. The SGS/IPP/ IPP selling power on merchant basis /CGP shall also declare the possible ramping up / ramping down in a block. In case of a gas turbine generating station or a combined cycle generating station, the generating station shall declare the capacity for units and modules on APM gas, RLNG and liquid fuel separately, and these shall be scheduled separately.

(14) While making or revising its declaration of capability, except in case of run-off-river (with up to three hour pondage) hydro stations, the SGS/ISGS shall ensure that the declared capability during peak hours is not less than that during other hours. However, exception to this rule shall be allowed in case of tripping/re-synchronization of units as a result of forced outage of units.

(15) It shall be incumbent upon the SGS/ISGS/IPP/ IPP selling power on merchant basis to declare the plant capabilities faithfully, i.e., according to their best assessment. In case, it is suspected that they have deliberately over/under declared the plant capability contemplating to deviate from the schedules given on the basis of their capability declarations (and thus make money either as undue

capacity charge or as the charge for deviations from schedule), the SLDC may ask the SGS/ISGS/IPP/ IPP selling power on merchant basis to explain the situation with necessary backup data.

(16) The SGS/IPP/ IPP selling power on merchant basis /CGP shall be required to demonstrate the declared capability of its generating station as and when asked by the SLDC. In the event of the SGS/IPP/ IPP selling power on merchant basis/ CGP failing to demonstrate the declared capability, the capacity charges due to the generator shall be reduced as a measure of penalty. In case of revision of schedule of a generating unit, the schedules of all transactions under the long-term access, medium-term open access and short-term open access (except collective transactions through power exchange), shall be reduced on pro-rata basis.

(17) The quantum of penalty for the first mis-declaration for any duration/block in a day shall be the charges corresponding to two days fixed charges. For the second mis-declaration the penalty shall be equivalent to fixed charges for four days and for subsequent mis-declarations, the penalty shall be multiplied in the geometrical progression over a period of a month

(18) The STU shall install special energy meters on all inter connections between the Users/Beneficiaries and other identified points for recording of actual net MWh interchanges and MVArh drawals as per relevant CEA Regulation on Metering. The type of meters to be installed, metering scheme, metering capability, testing and calibration requirements and the scheme for collection and dissemination of metered data are detailed in Chapter-10. All concerned entities (in whose premises the special energy meters are installed) shall fully cooperate with the STU/SLDC and extend the necessary assistance for taking weekly meter readings by STU and transmitting them to the SLDC.

(19) The SLDC shall be responsible for computation of actual net MWh injection of each SGS/CGP /ISGS/ IPP selling power on merchant basis/ IPP and actual net drawal of each Beneficiary, 15 minute-wise, based on the above meter readings. The data shall be processed by SLDC to prepare monthly energy account, weekly UI account & reactive energy account. The processed statement shall be forwarded to GRIDCO / STU to prepare and issue the relevant invoice. All computations carried out by SLDC/GRIDCO/STU shall be open to all Users/Beneficiaries for checking / verifications for a period of 15 days. In case any mistake/omission is detected, the SLDC shall forthwith make a complete check and rectify the same.

(20) SLDC shall periodically review the actual deviation from the despatch and net Drawal Schedules being issued, to check whether any of the Beneficiaries / ISGS / SGS / IPP selling power on merchant basis/IPP who are allowed open access are indulging in unfair gaming or collusion. In case any such practice is detected, the matter shall be reported by the SLDC to Member Secretary, GCC for further investigation / action.

(21) Hydro Generating Stations are expected to respond to grid frequency changes and inflow fluctuations. The hydro generating stations shall be free to deviate from the given schedule without causing grid constraint and a compensation for difference between the actual net energy supply by the hydro generation station and the scheduled energy (ex-bus) over day shall be made by SLDC in the day ahead schedule for the 4th day (day plus 3).

6.5 SCHEDULING AND DESPATCH PROCEDURE

6.5.1 GENERATION SCHEDULING

1. All State Generating Stations (SGS) shall be duty listed on the SLDC web-site along with their respective installed capacity.
2. All generators including IPP shall provide the fifteen minutes block MW/MV Ar availability (00.00-24.00 hours) of their respective units, to SLDC on day ahead basis by 10.00 hours. CGPs shall provide the fifteen minutes block import/export figures on day ahead basis by 10.00 hours. While working out the MW/MV Ar availability, Hydro Power Stations shall take into account their respective reservoir levels and any other constraints and shall report the same to SLDC.

3. SLDC shall obtain from ERLDC, foreseen capabilities and fifteen minutes block MW and MWh entitlements from ISGS by 10 hours on day ahead basis.

4. SLDC shall review the State's own generating capability & entitlement from ISGS including bilateral exchanges, if any, and advise all the Distribution Licensees of the State, their respective entitlement, based on their percentage of share as approved by the Commission/Government, for the next day by 11 hours.

5. All the Distribution Licensee of the State shall forward their respective drawl schedule on day ahead basis to SLDC by 12 hours.

6. SLDC shall review its foreseen load pattern and State's own generating capability including bilateral exchanges, if any and shall advise ERLDC by 15 hours its Drawal Schedule for each of the ISGS in which the State has shares, long-term and medium-term bilateral interchanges, approved short term bilateral interchanges. While preparing the State's ISGS drawal schedule. SLDC shall take into account of the relative commercial costs of the Generation units.

7. The SLDC may also give standing instructions to the ERLDC such that ERLDC itself may decide the best drawal schedules for the State.

8. SLDC shall intimate the generation schedule/import schedule for the following day to all State's Generators/IPP/CGPs by 16.00 hours.

9. SLDC will receive fifteen minutes block "Net Drawal Schedule" in MW from ERLDC by 18.00 hours for the next day (00.00 hours to 24.00 hours).

10. SLDC shall prepare the 15 minutes block wise drawal schedule for all the Distribution Licensees for the next day considering the generation available from

various sources and drawal schedule furnished by them and their percentage of shares.

11. Generators including IPP shall promptly report to SLDC, changes of Generating Unit availability or capability, or any unexpected situation, which could affect its operation. ALL CGPs shall similarly report regarding their export to the State grid.

SLDC may inform any modification/changes ot be made station wise Drawal Schedule and bilateral interchanges/foreseen capabilities, if any, to ERLDC by 22.00 hours.

12. SLDC shall advise Users as soon as possible of any necessary rescheduling.

13. SLDC shall receive final Drawal Schedule from ERLDC by 23.00 hours.

14. SLDC shall prepare the day ahead generation schedule keeping in view the followings :
    (i) Transmission System constraints from time to time.
    (ii) Fifteen minutes block load requirements as estimated by SLDC.
    (iii) The need to provide Operating Margins and reserves required to be maintained.
    (iv) The availability of generation from State Generators, ISGS and CGPs together with constraints, if any, in each case.
    (v) Overall economy to the licensee and customers.

15. SLDC shall instruct generators to hold capacity reserves (spinning and /or stand by) to the agreed ERLDC guidelines or as determined for Local conditions (with due consideration of wastage of water/fuel as the case may be.

16. SLDC may also require the generators/IPP/CGPs to generate MVAR within their respective capability limit, i.e., without sacrificing the active generation, to hold station bus bar voltage at specified levels.

The SLDC shall also formulate the procedure for meeting contingencies both in the long run and in the short run (Daily scheduling).

Special dispensation for scheduling of wind and solar generation

I. Scheduling of wind power generation plant would have to be done for the purpose of UI where the sum of generation capacity of such plants connected at the connection point to the transmission or distribution system is 10 MW and above and where PPA has not been signed before 1st April 2014. For capacity and voltage level below this, as well as for old wind farms (a wind farm is a collection of wind turbine generators that are connected to a common connection point), it could be mutually decided between the wind generator and the transmission and distribution utility, as the case may be, if there is no existing contractual agreement to the contrary. The schedule by wind power generating stations (excluding collective transactions) may be revised by giving advance notice to SLDC/RLDC, as the case may be. Such revisions by wind power

generating stations shall be effective from 6th time block, the first being the time-block in which notice was given. There may be one revision for each time slot of 3 hours starting from 00:00 hours of a particular day subject to maximum of 8 revisions during the day.

II. The schedule of solar generation shall be given by the generator, based on availability of the generator, weather forecasting, solar insolation, season and normal solar generation curve and shall be vetted by the SLDC in which the generator is located and incorporated in the inter-state schedule. If SLDC is of the opinion that the schedule is not realistic, it may ask the soar generator to modify the schedule.

III. The SLDC shall maintain the record of the schedule from renewable power generating stations, based on the type of renewable energy sources; i.e. wind or solar from the point of view of grid security. While scheduling generating stations in a region, the system operator shall aim at utilizing available wind and solar energy fully.

Generation schedules and drawal schedules issued/revised by the SLDC shall become effective from designated time block irrespective of communication success.

For any revision of scheduled generation, including post facto deemed revision; there shall be a corresponding revision of scheduled drawls of the beneficiaries.

A procedure for recording the communication regarding changes to schedules duly taking into account the time factor shall be evolved by the State Transmission Utility.

When for the reason of transmission constraints, such as congestion, or in the interest of grid security, it becomes necessary to curtail power flow on a transmission corridor; the transactions already scheduled may be curtailed by the SLDC.

The short-term customer shall be curtailed first, followed by medium- term customers, who shall be followed by the long-term customers and amongst customers of a particular category, curtailment shall be on prorate basis.

After the operating day is over at 2400 hours, the schedule finally implemented during the day (taking into account all before-the-fact changes in despatch schedule of generating stations and drawal schedule of the Discoms) shall be issued by SLDC. These schedules shall be the datum for commercial accounting. The average ex-bus capability for each generating station shall also be worked out, based on all before-the-fact advice to SLDC.

If RLDCs curtail a transaction at the periphery of the regional entities, SLDC shall further incorporate the inter-se curtailment of intra-state entities to implement the curtailment.

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

The procedure for scheduling and the final schedules issued by SLDC shall be open to all intra-state entities and other intra-state open access customers entities for any checking/verification, for a period of five days. In case any mistake/omission is detected, the SLDC shall forthwith make a complete check and rectify the same.

While availability declaration by generating station shall have a resolution of one (1) MW and one (1) MWh, all entitlements, requisitions and schedules shall be rounded off to the nearest two decimals at each control area boundary for each of the transaction, to have a resolution of 0.01 MW and 0.01 MWh.

SLDC may also require the generators / CGPs to generate MVAR within their respective capability limit, i.e. without sacrificing the active generation, to hold station bus bar voltage at specified levels.

(2) GENERATION DESPATCH

All generators shall regulate generation and CGPs regulate their export according to the daily generation schedule.

All Generating Units, other than those in a CGP, will be subject to central despatch instructions. CGPs will be subject to these instructions as applicable to their respective exports to the licensee.

SLDC will despatch by instruction all generation and imports from CGPs according to the fifteen minutes block day ahead generation schedule, unless rescheduling is required due to unforeseen circumstances.

On the day of operation (00.00 to 24.00 hours), in the event of a contingency, SLDC may revise their Drawal Schedule from any / all ISGS and Chukha Hydro Power Station within entitlement. ERLDC will revise and issue Drawal Schedule in consultation with SLDC. All such revisions shall be effective one hour after first advice given to ERLDC.

In absence of any despatch instructions by SLDC, State Generators and CGPs shall generate/export according to the day ahead generation schedule.

Despatch instructions shall be in standard format. These instructions will recognise declared availability and other parameters, which have been made available by the State Generator to SLDC. These instructions shall include time, Power Station, Generating Units (total export in the case of CGP), name of operators sending and receiving the same.

Despatch instructions may include:

(i) To switch a generator into or out of service.
(ii) Details of reserve to be carried on a unit.
(iii) To increase or decrease MVAr generation to assist with voltage profile.
(iv) To begin pre-planned Black Start procedures.
(v) To hold spinning reserve.
(vi) To hold Generating Units on standby.

(3) COMMUNICATION WITH GENERATORS

Despatch instructions shall be issued by e-mail/telephone, confirmed by exchange of names of operators sending and receiving the same and logging the same at each end. All such oral instructions shall be complied with forthwith and written confirmation shall be issued promptly by Fax, Teleprinter or otherwise.

6.6 **ACTION REQUIRED BY GENERATORS**

All generators and CGPs shall comply promptly with a despatch instruction issued by SLDC unless this action would compromise the safety of plant or personnel.

The Generators and CGPs are required to abide by Sections 5.3 and 5.2 regarding operation of governors and AVRs respectively.

The generator and CGPs shall promptly inform SLDC in the event of any unforeseen difficulties in carrying out an instruction.

Generators shall immediately inform SLDC by telephone of any loss or change (temporary or otherwise) to the operational capability of any Generating Unit which is synchronised to the system or which is being used to maintain system reserve. Generators shall inform SLDC any removal of AVR and/or governor from service with reasons.

CGPs shall similarly inform any change in status affecting their ability in complying with despatch instructions.

Generators shall not de-synchronise Generating Units, other than in respect of CGPs, without instruction from SLDC except on the grounds of safety to plant or personnel, which shall be promptly reported to SLDC.

Generators and CGPs shall report any abnormal voltage and frequency related operation of Generating Units / feeders promptly to SLDC.

Generators shall not synchronise Generating Units, other than in respect of CGPs, without instruction from SLDC. In emergency situations, the generator may synchronise Units with the grid without prior intimation in the interest of the operation of the grid following standing institutions developed for such purpose under “Contingency Planning”.

Should a generator fail to comply with any of the above provisions, it shall inform SLDC promptly of this failure.

6.7 **ENHANCEMENT OF SCHEDULE AND DESPATCH PROCEDURE**

Schedule and despatch procedures shall be suitably enhanced to cater to tariff agreements as soon as any such agreement is reached with generators, IPPs, and CGPs.

6.8 **DATA REQUIREMENTS**

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

Annexure-1 to Chapter-6
{Refer Clause 6.1 (c)}
COMPLEMENTARY COMMERCIAL MECHANISMS

1. All Beneficiaries shall pay to the SGS Capacity charges corresponding to plant availability and Energy charges for the scheduled despatch, as per the relevant notifications and orders of OERC. The bills for these charges shall be issued by the respective SGS to each Beneficiary on monthly basis.

2. The sum of the above two charges from all Beneficiaries shall fully reimburse the SGS for generation according to the given Despatch Schedule. In case of a deviation from the Despatch Schedule, the concerned SGS shall be additionally paid for excess generation through the UI mechanism approved by OERC. In case of actual generation falling below the given Despatch Schedule, the concerned SGS shall pay back through the UI mechanism for the shortfall in generation. In case of ISGS who are allowed Open Access, the deviation from despatch schedule shall be governed by UI mechanism.

3. The summation of station-wise Ex-power Plant Despatch Schedules from each SGS and drawal from each ISGS shall be adjusted for export to other states and transmission losses. The net drawal so calculated shall be treated as total drawal of the State. In case of excess drawal to the scheduled load, the Distribution Licensee shall be required to pay through the UI mechanism for the excess energy. In case of under-drawal, the Beneficiary shall be paid back through the UI mechanism, for the energy not drawn.

4. Energy Accounts shall be prepared on monthly basis and the statement of UI charges and Reactive Energy Charges shall be prepared by the SLDC on a weekly basis based on the data provided by the SLDC as per provisions under Section 6.4. (14) and these shall be issued to all Beneficiaries by Tuesday for the seven-day period ending on the previous Sunday mid-night. Payment of UI charges shall have a high priority and the concerned Beneficiary shall pay the indicated amounts within 10 (ten) days of the statement issue into a State UI pool account operated by the SLDC. The Agencies who have to receive the money on account of UI charges would then be paid out from the State UI pool account, within three (3) working days.

5. The SLDC shall also issue the weekly statement for VAr charges, to all Beneficiary who have a net drawal/injection of reactive energy under low/high voltage conditions. These payments shall also have a high priority and the concerned Agencies shall pay the indicated amounts into State reactive account operated by the SLDC within 10 (ten) days of statement issue. The Agency who has to receive the money on account of VAr charges would then be paid out from the state reactive account, within three (3) working days.

6. If payments against the above UI and VAr charges are delayed by more than two days, i.e., beyond twelve (12) days from statement issue, the defaulting Agency shall have to pay simple interest @ 0.04% for each day of delay. The interest so collected shall be paid to the Agency who had to receive the amount, payment of which got delayed. Persistent payment defaults, if any, shall be reported by the SLDC to the Member Secretary, GCC, for initiating remedial action.

7. The money remaining in the state reactive account after pay-out of all VAr charges up to 31st March of every year shall be utilized for training of the SLDC/ALDC operators, and other similar purposes which would help in improving / streamlining the operation of the state grid, as decided by GCC from time to time.

8. In case the voltage profile of the State grid improves to an extent that the total pay-out from the state VAr charges account for a week exceeds the total amount being paid-in for that week, and if the State reactive account has no balance to meet the deficit, the pay-outs shall be proportionately reduced according to the total money available in the above account.

9. The SLDC shall table the complete statement of the state UI account and the state Reactive Energy account in the GCC's Commercial Committee meeting, on a quarterly basis, for audit by the latter.

10. All Accounting Calculations carried out by SLDC shall be open to all Agencies for any checking/verification, for a period of 15 days. In case any mistake is detected, SLDC shall forthwith make a complete check and notify the mistakes.

11. All 15-minute energy figures (net scheduled, actually metered and UI) shall be rounded off to the nearest 0.01 MWh.

12. Complementary Commercial Mechanism for wind and solar generators shall be according to the Indian Electricity Grid Code (IEGC), 2010 and as amended from time to time.

CHAPTER-7

MONITORING OF GENERATION AND DRAWAL

7.1 INTRODUCTION

This section covers the procedure to be followed by the SLDC for monitoring the generating output, Active and Reactive reserve capacity required for evaluation of the performance of the generating station.

The monitoring of scheduled drawal is important to ensure that the licensee contributes towards improving regional performance, and observes grid discipline.

7.2 OBJECTIVE

The objective of this Chapter is to define the responsibilities of all Users in the monitoring of Generating Unit reliability and performance, and the licensee's compliance with the scheduled drawal.

7.3 MONITORING PROCEDURE

(1) For effective operation of the Transmission System, it is important that a generator's declared availability is realistic and that any departures are continually fed back to the generator to help effect improvement.

SLDC shall continuously monitor Generating Unit outputs and bus voltages. More stringent monitoring may be performed at any time when there is reason to believe that a generator's declared availability may not match the actual availability or declared output does not match the actual output.

SLDC shall inform a generator, in writing, if the continual monitoring demonstrates an apparent persistent or material mismatch between the despatch instructions and the Generating Unit output or breach of the Connection Conditions. This more stringent monitoring may be carried out by SLDC, if agreement is not reached on the Generating Unit performance. The results of the stringent monitoring will be reported by SLDC to the generator. Continual discrepancies shall be resolved at appropriate level {ref- Sections 1.18 and 6.4(15)} with a view to either improving performance, providing more realistic declarations or correcting any breach of Connection Conditions.

Generators shall provide to SLDC block wise generation summation outputs where no automatically transmitted metering or SCADA equipment exists. CGPs shall provide to SLDC hourly export/import MW and MVAr.

The generator shall provide other logged readings, that SLDC may reasonably require, for monitoring purposes where SCADA data is not available.

(2) Generating Unit Tripping

Generators shall promptly inform the tripping of a Generating Unit, with reasons, to SLDC in accordance with the Operational Event/Accident Reporting Section. The approximate and expected time of resynchronisation with grid shall be informed to the SLDC. SLDC shall keep a written log of all such tripping, including the reasons with a view to demonstrating the effect on system performance and identifying the need for remedial measures.

Generators shall submit a more detailed report of Generating Unit tripping to SLDC monthly.

(3) Monitoring of Drawal

SLDC shall continuously monitor actual MW drawal against that scheduled, by use of SCADA equipment where available, or otherwise using available metering. SLDC shall request ERLDC and adjacent States as appropriate to provide any additional data required to enable this monitoring to be carried out.

SLDC shall continuously monitor the actual MVAr drawal to the extent possible. This will be used to assist in Transmission System voltage management.

(4) Data Requirements

Generators and CGPs shall submit data to SLDC as listed in Data Registration Chapter-12, termed as Monitoring of Generation.

CHAPTER-8

CROSS BOUNDARY SAFETY

8.1 INTRODUCTION

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

8.2 OBJECTIVE

The objective of this Chapter is to achieve agreement and consistency on the principles of safety as prescribed in the Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010 when working across a control boundary between the Transmission Licensee and another User.

8.3 CONTROL PERSONS

The Transmission Licensee and all Users shall nominate suitably authorised persons to be responsible for the co-ordination of safety across that company boundary. These persons shall be referred to as Control Persons.

8.4 PROCEDURE

The Transmission Licensee shall issue a list of Control Persons (names, designations and telephone numbers) to all Users who have a direct control boundary with the Transmission Licensee. This list shall be updated promptly whenever there is change of name, designation or telephone number.

All Users with a direct control boundary with the Transmission Licensee shall issue a similar list of their Control Persons to the Transmission Licensee, which shall be updated promptly whenever there is a change to the Control Persons list.

Whenever work across a control boundary is to be carried out, the Control Person, of the User (which may be the Transmission Licensee), wishing to carry out work shall directly contact the other relevant Control Person. Code words will be agreed at the time of work to ensure correct identification of both parties.

Contact between the Control Persons shall normally be by direct telephone. Should the work extend over more than one shift the Control Person shall ensure that the relief Control Person is fully briefed on the nature of the work and the code words in operation.

The Control Persons shall co-operate to establish and maintain the precautions necessary for the required work to be carried out in a safe manner. Both the established isolation and the established earth shall be locked in position, where such facilities exist, and shall be clearly identified.

Work shall not commence until the Control Person, of the User (which may be the Transmission Licensee), wishing to carry out the work, is satisfied that all the safety precautions have been established. This Control Person shall issue agreed safety documentation to the working party to allow work to commence.

When work is completed and safety precautions are no longer required, the Control Person who has been responsible for the work being carried out shall make direct contact with the other Control Person to request removal of those safety precautions.

The equipment shall only be considered as suitable for return to service when all safety precautions are confirmed as removed, by direct communication using code word contact between the two Control Persons, and return of agreed safety documentation from the working party has taken place.

The Transmission Licensee shall develop an agreed written procedure for cross boundary safety and continually update it.

Any dispute concerning Cross Boundary Safety shall be resolved in the Protection Co-ordination Committee.

8.5 SPECIAL CONSIDERATIONS

All Users shall comply with the agreed safety rules, which must be in accordance with Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations, 2010.

All equipment on cross boundary circuits which may be used for the purpose of safety co-ordination and establishment of isolation and earthing, shall be permanently and clearly marked with an identification number or name, that number or name being unique in that sub-station. This equipment shall be regularly inspected and maintained in accordance with manufacturer's specification.

Each Control Person shall maintain a legibly written safety log, in chronological order, of all operations and messages relating to safety co-ordination sent and received by himself. All safety logs shall be retained for a period of not less than 5 (five) years.

CHAPTER-9

PROTECTION

9.1 INTRODUCTION

In order to safeguard a User's system from faults, which may occur on another User's system, it is essential that certain minimum standards of protection are adopted. This Section describes these minimum standards.

9.2 OBJECTIVE

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

9.3 GENERAL PRINCIPLES

No item of electrical equipment shall be allowed to remain connected to the Transmission System unless it is covered by appropriate protection aimed at reliability, selectivity, speed and sensitivity. Guidelines mentioned in protection manuals of Central Bureau of Irrigation & Power (CBI & P) may be kept in view.

All Users shall co-operate with the Transmission Licensee to ensure correct and appropriate settings of protection to achieve effective, discriminator removal of faulty equipment within the time for target clearance specified in this Chapter.

Protection settings shall not be altered, or protection bypassed and/or disconnected without consultation and agreement of all affected Users. In the case where protection is bypassed and / or disconnected, by agreement, then the cause must be rectified and the protection restored to normal condition as quickly as possible. If agreement has not been reached the electrical equipment will be removed from service forthwith.

There shall be provision of distance protection schemes with carrier inter tripping between the grid s/s of the STU/Transmission licensee and the users capable of injecting power to the transmission system. This should be used in case of Captive Generating Plants connected to the grid and for those Users connected to the STU/Transmission System through multiple feeders.

In case of users as indicated above distance protection schemes as per the guidelines of Indian Standard Specification (ISS/IEC) shall have to be provided both at the grid end as well as at the users end.

In case of all CGPs/IPPs connected to the grid substation of the Transmission Licensee, Users capable of injecting power to the transmission system at 33 KV and above (at STU's grid sub-station) shall provide Reverse Power Relays at the point of interconnection.

9.4 PROTECTION CO-ORDINATION

The STU's Protection Co-ordination committee shall be responsible for arranging periodical meetings between all Users to discuss co-ordination of protection. The STU shall investigate any mal-function of protection or other unsatisfactory protection issues. Users shall take prompt action to correct any protection mal-function or issue as discussed and agreed to in these periodical meetings.
Relay setting coordination shall be done at Regional level by ERPC.

9.5 FAULT CLEARANCE TIMES

From a stability consideration the maximum fault clearance times for faults on any User's system directly connected to the Transmission System, or any faults on the Transmission System itself, are as referred at Section 4.8(3) of Chapter-4.

Slower fault clearance times for faults on a Users system may be agreed to but only if, in the Transmission Licensee's opinion, system conditions allow this.

9.6 GENERATOR REQUIREMENTS

All Generating Units and all associated electrical equipment of the generator 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.

9.7 TRANSMISSION LINE REQUIREMENTS

(1) Every EHV line taking off from a Power Station or a sub-station shall have distance protection and back up protection as mentioned below. The Transmission Licensee shall notify Users of any changes in its policy on protection from time to time.

(a) 400 kV Lines

Three zone static non-switched distance protection with permissive inter trip for accelerating tripping at remote end in case of a zone-2 fault as main-1 protection shall be provided. Main-2 protection shall be similar fast protection using direction comparison or phase comparison carrier relaying scheme. 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 static non-switched distance protection with permissive inter trip for accelerating tripping at remote end in case of zone-2 fault as main protection is to be provided. The back up will be three phase directional over current and earth fault protection. One pole tripping and single shot single pole auto-reclosing with adjustable dead time shall be provided.

(c) 132 kV Line

Three-zone static or electro-magnetic distance protection with permissive inter-trip for accelerating tripping at remote end in case of a zone-2 fault shall be provided as main

protection. The backup will be directional three poles over current and earth fault protection.

(1) General: - For short transmission lines alternative appropriate protection schemes may be adopted. Relay Panels for the protection of lines of the Transmission Licensee taking off from a Power Station shall be owned and maintained by the Transmission Licensee. Generators shall provide space, connection facility, and access to the Transmission Licensee, for such purpose.

(2) Review of protection system for accommodating technological up gradation shall be carried out if it would result in efficient operation of the Power System and decision taken shall be implemented with information to the Commission.

(3) In case of EHT consumers connected through single circuits by radial feeders there is no scope of back feeding to the system. Hence, there is no utility of a distance protection relay in respect of such consumers at the consumer end. However, there is need of distance protection scheme for all EHT feeders including radial feeders emanating from the grid substations at the grid S/S end.

(4) The distance relay can be applied for the protection of short lines, Transformer feeders, to Tee lines, double circuit lines as well as it can be applied for single pole and triple pole auto reclosing.

(5) The distance relay can be applied for 66/33 KV network also.

9.8 DISTRIBUTION LINE REQUIREMENTS

All 33 kV and 11 kV lines at Connection Points shall be provided with breakers having a minimum of over current and earth fault protection with or without directional features so that fault occurred at their end will not be reflected to wards grid sub-station end. The features are given below.

(1) Non-Parallel Radial Feeders

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

(2) Parallel Feeders/ Ring Feeders

Directional time lag over current and earth fault relays.

(3) Long Feeders/Transformer Feeders

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

9.9 TRANSFORMER REQUIREMENTS

(1) Generating Station/ Transmission System

All windings of autotransformers 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.

(2) Distribution System

For transformers of HV class on the Distribution System differential protection shall be provided for 5 MVA and above along with back up time lag over current and earth fault protection (with directional feature for parallel operations). Transformers 1.6 MVA and above and less than 5 MVA shall be protected by time lag over current, earth fault and instantaneous REF relays. In addition all transformers 1.6 MVA and above shall be provided with gas-operated relays, temperature protection and winding temperature protection and oil temperature protection.

9.10 SUB-STATION BUS BAR AND FIRE PROTECTION

(1) All Users shall provide adequate bus zone protection for sub-station bus bars in all 400 kV and 220 kV class sub-stations.

(2) Adequate precautions shall be taken and protection shall be provided against fire hazards to all Apparatus of the Users conforming to relevant Indian Standard Specification and / or provisions in IE Rules.

9.11 DATA REQUIREMENTS

Users shall provide the Transmission Licensee with data for this Section as specified in the Data Registration Chapter.

CHAPTER-10

METERING AND COMMUNICATION AND DATA ACQUISITION

10.1 INTRODUCTION

This Chapter specifies the minimum operational and commercial metering, communication and data acquisition requirements to be provided by each User at the inter-Connection Points and also at the cross boundary circuits. The Special Energy Meters addressed at 10.6 below covers following meters of CEA (Installation and Operation of Meters) Regulation, 2006.

(i) Interface Meters are –
   (a) the meters installed at the points of interconnection with inter/intra State Transmission System for purpose of electricity accounting and billing.
   (b) the meters installed at the points of interconnection between the two licensees for purpose of electricity accounting and billing.
   (c) the meters installed at the points of interconnection with inter/intra State Transmission System for a consumer who has been permitted open access by the Appropriate Commission for purpose of electricity accounting and billing.
   (d) the meters installed at the points of interconnection with Distribution System for a consumer who has been permitted open access by the Appropriate Commission for purpose of electricity accounting and billing.

(ii) Energy Accounting and Auditing Meters-
   These are the meters installed to account for energy generated, transmitted, distributed and consumed in various segments of the power system and the energy loss.

10.2 OBJECTIVE

The objective of this Chapter is to define the minimum acceptable metering and communication and data acquisition requirements to enable the Transmission Licensee to manage the Transmission System in a safe and economic manner consistent with licence requirements.

10.3 GENERATION OPERATIONAL METERING

(1) This Section specifies the facilities that shall be provided, certain practices that shall be employed for monitoring output and response of Power Stations and Generating Units and shall not apply to generator including CGP upto 25 MW for dedicated line (tie line) and upto 15 MW in case of non-dedicated (non-tie) line.

(2) The generator shall install operational metering to the STU 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:

   (i) Bus Voltage
   (ii) Frequency
   (iii) MW

(iv) MVAr

and any other additional data as agreed between the Transmission Licensee and generator.

(3) All current transformers and voltage transformers used in conjunction with operational metering shall conform to relevant Indian Standard Specifications or the relevant IEC, of accuracy class 0.5 and of suitable rating to cater to the meters and the lead wire burdens.

(4) Metering shall be calibrated, so as to achieve overall accuracy of operational metering in the limits as agreed between the licensee and generator. Records of calibration shall be maintained for reference and shall be made available to the licensee upon request.

(5) Generators shall furnish recorded data of all electrical measurements and events recorded by the operational metering to the licensee at least once in a week or more often if required.

10.4 TRANSMISSION SYSTEM OPERATIONAL METERING

(1) This Section specifies the facilities that shall be provided, certain practices that shall be employed for monitoring electrical supply and load characteristic at each sub-station.

(2) The licensee shall install operational metering so as to provide operational information for both real time and recording purposes in relation to each feeder, transformer and compensation device at each sub-station in respect of:

(i) Bus Voltage
(ii) Frequency
(iii) MW
(iv) MVAr
(v) Power Factor
(vi) Current.

10.5 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

(1) The Licensee shall install and make operative an operational metering data collection system under SCADA for storage, display and processing of operational metering data. All Users shall make available outputs of their respective operational meters to the SCADA interface equipment.

(2) The data collection, storage and display centre of the STU shall be the State Load Despatch Centre at Bhubaneswar.

10.6 REGULATORY REQUIREMENTS OF SPECIAL ENERGY METERS

(1) Special energy meters (i.e. including export/import meters for CGPs and meters for the start up power exchange for the generators) of a uniform technical

specification shall be provided on the electrical periphery of each Beneficiary, to determine its actual net interchange with the State grid. Each interconnection shall have one (1) Main meter. In addition, Standby/check meters shall be provided such that correct computation of net interchange of a Beneficiary is possible even when a Main meter, a CT or a VT has a problem.

(2) The Special energy meters shall be static type, composite meters, installed circuit-wise, as self-contained devices for measurement of active and reactive energy, and certain other parameters as described in the following sections. The meters shall be suitable for being connected directly to voltage transformers (VTs) having a rated secondary line-to-line voltage of 110 V, and to current transformers (CTs) having a rated secondary current of 1A (model-A: 3 element 4 wires or Model C: 2 element, 3 wire) or 5A (model-B : 3 element, 4 wire or Model D : 2 element 3 wire). The reference frequency shall be 50 Hz.

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

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

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

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

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

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

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

(4) The meters shall store all the above listed data in their memories for a period of ten (10) days. The data older than (10) days shall get erased automatically. Each meter shall have an optical port on its front for tapping all data stored in its memory using a hand held data collection device. The meter shall be suitable for transmitting the data to remote location using appropriate communication medium.

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

(6) The VAr and reactive energy measurement shall also be on 3-phase, 4-wire principle, with accuracy as per class 2 of IEC-62053-23 or better. In model-A or model C, the VAr and VArh computation shall be directly in CT and VT secondary qualities. In model-B or model D, the above quantities shall be displayed and recorded as one-fifth of those computed in CT and VT secondary

quantities. There shall be two reactive energy registers, one for the period when average RMS voltage is above 103% and the other for the period the voltage is below 97%.

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

(8) The meters shall also display (on demand), by turn, the following parameters:
- (i) Unique identification number of the meter
- (ii) Date
- (iii) Time
- (iv) Cumulative Wh register reading
- (v) Average frequency of the previous 15-minute block
- (vi) Net Wh transmittal in the previous 15-minute block, with +/- sign
- (vii) Average percentage voltage
- (viii) Reactive power, with +/- sign
- (ix) Voltage-high VArh register reading
- (x) Voltage-low VArh register reading

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

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

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

(12) All metering equipment shall be of proven quality, fully type-tested, individually tested and accepted by the STU before despatch from manufacturer's work.

(13) In-situ functional checking and rough testing of accuracy shall be carried out for all meters once a year by the STU, with portable test equipment complying with IEC-60736, for type and acceptance testing of energy meters of 1.0 class.

(14) The current and voltage transformers to which the above special energy meters are connected shall have a measurement accuracy class of 0.5 or better. Main and Standby/check meters shall be connected to different sets of CTs and VTs, wherever available.

(15) Only functional requirements from regulatory perspective are given in this code. Detailed specifications for the meters, their accessories and testing, and procedures for collecting their weekly readings shall be finalized by the STU.

(16) Meters shall be tested and calibrated at such interval as specified in the CEA (Installation and Operation of Meters) Regulations, 2006 or such period as mutually agreed between generator and the licensee according to guidelines provided in relevant Indian Standard Specification or relevant IEC as applicable. Records of meter calibration test shall be maintained for future reference.

(17) A procedure shall be drawn up between the licensee and generators, and between the licensee and Power Grid covering summation, collection, processing of tariff meter readings, at various connection sites. This may be revised from time to time as necessary.

(18) The ownership and responsibility of maintenance and testing of meters shall be as mutually agreed between the Users and the licensees.

(19) CEA (Installation and Operation of Meters) Regulations, 2006 may please be referred and adopted which provide for type, standards, ownership, location, accuracy class, installation, operation, testing and maintenance, access, sealing, safety, meter reading and recording, meter failure or discrepancies, anti-tampering features, quality assurance, calibration and periodical testing of meters, additional meters and adoption of new technologies in respect of interface meters for correct accounting, billing and audit of electricity.

10.7 COMMUNICATION

Independent dedicated communication links for voice communication, for written communication and for data acquisition shall be installed by the STU/ Transmission licensee between all Power Stations, Transmission System sub-stations and SLDC. In addition, similar links between adjacent Transmission System sub-stations shall be established. Communication shall be available by dialling discrete numbers and also through Hot line by lifting the telephone hand set. Hot line links shall be established by the Transmission Licensee between Power Station / important sub-station and SLDC.

10.8 DATA ACQUISITION

(1) For effective control of the Transmission System, the SLDC needs real time data as follows:
   (i) MW generated in each Power Station.
   (ii) MW draw from External Interconnection.
   (iii) MVAr generated or absorbed in each Power Station.
   (iv) MVAr imported or exported from External Interconnection.
   (v) Voltage in all system buses.
   (vi) Frequency in Transmission System.
   (vii) MW & MVAr flow in each transmission line.

(2) Generators shall provide necessary transducers for the transmission of the above data to SLDC.

(3) The Transmission Licensee shall similarly provide necessary transducers in their system for the transmission of the above data to SLDC.

(4) The SLDC shall establish a suitable data transfer link between SLDC and ERLDC for the exchange of operational data.

10.9 PROCEDURE FOR COMMUNICATION AND DATA TRANSMISSION

The procedure for regulating technical standards for connectivity to the Grid, establishment of voice and data communication to SLDC outlining inter responsibility, accountability and recording of day-to-day communication and data transmission on operational matters is as per the "procedure for provisions of voice and data communication facilities"(approved by OERC) and notified by OPTCL in extraordinary Odisha Gazette No.485 dt.29.03.2012.

Data Requirement

The licensee and Users shall furnish metering data to each other, as applicable and as detailed in Data Registration Chapter.

10.10 Application of CEA Regulations –

The provisions of the Regulations framed by Central Electricity Authority (CEA) under Section 55(1), 73(e) and 177(2)(c) of the Electricity Act, 2003 as amended from time to time, shall be applicable with regard to installation and operation of meters. In case there is any inconsistency between CEA Regulations and this Code, the former shall prevail.

10.11 Application of IEGC Regulations and Manual on Transmission Planning Criteria of CEA –

The provisions of the IEGC Regulations framed by CERC under section 79(i)(h) read with 178(2)(g) of the Electricity Act as amended from time to time and orders, if any, on this matter by CERC shall be applicable. In case there is any inconsistency between IEGC and this Code the former shall prevail. The Manual on Transmission Planning criteria of CEA and amendment thereto shall also be applicable.

CHAPTER-11

MANAGEMENT OF THE ODISHA GRID CODE

11.1 MANAGEMENT OF OGC

The OGC shall be specified by the OERC as per section 86 (1) (h) of the Act. Any amendments to OGC shall also be specified by OERC only.

(1) The OGC and its amendments shall be finalized and notified adopting the prescribed procedure followed for regulations issued by OERC.

(2) The requests for amendments to / modifications in the OGC and for removal of difficulties shall be addressed to Secretary, OGC, for periodic consideration, consultation and disposal.

Such amendments/modifications suggested shall be finalized after obtaining opinions from all Users of the State Grid.

(3) Any dispute or query regarding interpretation of OGC may be addressed to Secretary, OERC and clarification issued by the OERC shall be taken as final and binding on all concerned.

(19) The OERC shall specify the OGC for operation of the State Transmission System as per section 86 (1) (h) of the Act, ensuring that they are consistent with the IEGC.

11.2 GRID COORDINATION COMMITTEE (GCC)

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

(2) The Grid Coordination Committee shall be responsible for the following matters, namely-

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

(ii) Assessing and recommending remedial measures for issues that might arise during the course of implementation of provisions of these Regulations and the rules and procedures developed under the provisions of these Regulations;

(i) Periodical review of the OGC, in accordance with the provisions of the Act and these Regulations;

(ii) Analyse any major grid disturbance soon after its occurrence,

(iii)Examining problems raised by the Users, and

(iv)Investigate / take action in case any Beneficiary is indulging in unfair gaming or collusion after getting reported from SLDC.

(v) Initiate remedial action against persistent default payment of UI and VAr charges reported by SLDC.

(vi) Decide utilisation of money remaining in the State reactive account (Refer Clause 7 of Complementary Commercial Mechanisms)

(vii) Audit the complete statement of the State UI and the State Reactive Energy account tabled by SLDC by its Commercial Committee (a sub-committee of GCC).

(x) Such other matters as may be directed by the Commission from time to time.

(3) The Grid Coordination Committee shall comprise of the following members:

(i) One member of the SLDC;
(ii) One member from State Transmission Utility i.e. OPTCL;
(iii) One member to represent the each of the generating companies in the State namely OHPC, OPGC and NTPC (TTPS);
(iv) One member to represent the Transmission Licensees in the State, other than the STU;
(v) One member to represent each of the Distribution Licensees in the State;
(vi) One member to represent GRIDCO;
(vii) One member to represent the Trading Licensees in the state, (other than GRIDCO);
(viii) One representative of Captive Generating Plants from the State having installed capacity more than 100 MW;
(ix) One representative of PGCIL;
(x) One representative from ERLDC;
(xi) One representative from OERC as an observer, and
(xii) Such other persons as may be nominated by the Commission.

(4) The Members of the Committee shall elect a Chairman from among themselves for a period of one year after which a new Chairman will be elected for next year. Provided that the STU shall nominate some of its senior officers as Member Secretary.
Provided further that the STU shall, in coordination with SLDC, facilitate and manage the functioning of the (GCC).

(5) The members of the (GCC); shall be selected as follows:

(i) The concerned Director of STU, having the responsibility of looking after technical activities of STU shall be the member referred to in Section 11.2 (3).(ii) above;
(ii) the member referred to in Section11.2 (3) (i) above, shall be the head of SLDC;
(iii) the members referred to in clauses (iii), (iv), (v), (vi) and (vii) of Section 11.2 (3) above shall be nominated by their respective organizations;
(iv) Organizations referred under Sections 11.2(3)(iv), (vii) and (viii) will be selected in rotation from among all such organizations in the State. The term of each such member, selected in rotation, shall be one (1) year.

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

(6) As SLDC would be represented as one of the member of the Committee, the decisions of the Committee arrived by consensus regarding operation of the State Grid and scheduling and dispatch of electricity will be followed by SLDC subject to direction of the Commission, if any.

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

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

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

(10) The Committee shall meet at least once in a quarter and at such other time as may be considered necessary**.**

CHAPTER-12
DATA REGISTRATION

12.1 INTRODUCTION

This Chapter contains a list of all data required by the Transmission Licensee which is to be provided by Users and data required by Users to be provided by the Transmission Licensee at times specified in the OGC. Other Chapters of the OGC contain the obligation to submit the data and defines the times when data is to be supplied by Users.

12.2 OBJECTIVE

The objective of this Chapter is to list all the data required to be provided by Users to the Transmission Licensee and vice versa, in accordance with the provisions of the OGC.

12.3 RESPONSIBILITIES

All Users are responsible for submitting up-to-date data to the Transmission Licensee in accordance with the provisions of the OGC.
All Users shall provide the Transmission Licensee with the name, address and telephone number of the person responsible for sending the data.

The Transmission Licensee shall inform all Users of the name, address and telephone number of the person responsible for receiving data.

The Transmission Licensee shall provide up-to-date data to Users as provided in the relevant schedule of the OGC.

Responsibility for the correctness of data rests with the concerned Users providing the data.

12.4 DATA CATEGORIES AND STAGES IN REGISTRATION

Data as required to be exchanged have been listed in the Appendices (see Section 12.8) of this chapter under various categories with cross- reference to the concerned chapter.

12.5 CHANGES TO USERS DATA

Whenever any User becomes aware of a change to any items of data, which is registered with the Transmission Licensee, the User must promptly notify the Transmission Licensee of the changes. The Transmission Licensee on receipt of intimation of the changes shall promptly correct the database accordingly. This shall also apply to any data complied by the Transmission Licensee regarding to its own system.

12.6 DATA NOT SUPPLIED

Users are obliged to supply data as referred to in the individual chapter of the OGC and listed out in the Data Registration Chapter Appendices. In case any data is missing and not supplied by any User, the Transmission Licensee may, acting reasonably, if and when necessary, estimates such data depending upon the urgency of the situation. Similarly in case any data is missing and not supplied by the Transmission Licensee, the

concerned User may, acting reasonably, if and when necessary, estimates such data depending upon urgency of the situation. Such estimates will in each case, be based upon corresponding data for similar plant or Apparatus or upon such other information, the User or the Transmission Licensee, as the case may be, deems appropriate.

12.7 SPECIAL CONSIDERATIONS

The Transmission Licensee and any other User may at any time make reasonable request for extra data as necessary.

12.8 APPENDICES

APPENDIX- A

DATA REGISTRATION

STANDARD PLANNING DATA

REFERENCE TO:

CHAPTER 3 SYSTEM PLANNING

CHAPTER-4 CONNECTION CONDITION

A.1 STANDARD PLANNING DATA (GENERATION)

A.1.1 THERMAL (COAL / FUEL LINKED)

A.1.1.1 GENERAL

i. Site	Give location map to scale showing roads, railway lines, transmission lines, rivers and reservoirs if any.
ii. Coal linkage/ Fuel (Like Liquid Natural Gas, Naptha etc.) linkage	Give information on means of coal transport from coalmines in case of pithead stations or means of coal carriage if coal is to be brought from (distance). In case of other fuels, give details of source of fuel and their transport.
iii. Water Sources	Give information on availability of water for operation of the Power Station.
iv. Environmental	State whether forest, lands mining clearance areas are affected.
v. Site map (To Scale)	Showing area required for Power Station coal linkage, coal yard, water pipe line, ash disposal area, colony etc.
vi. Approximate period of construction.	

A.1.1.2 CONNECTION

i. Point of Connection	Give Single Line Diagram of the proposed Connection with the system.
ii. Step up voltage for connection in kV.	

A.1.1.3 STATION CAPACITY

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

A.1.1.4 GENERATING UNIT DATA

i. Steam Generating Unit	State type, capacity, steam pressure, steam temperature etc.
ii. Steam turbine	State type, and capacity.
iii. Generator	a. Type b. Rating (MVA) c. Terminal voltage (kV) d. Rated Power Factor e. Reactive Power Capability (MVAr) in the range 0.95 of leading and 0.85 lagging f. Short Circuit Ratio g. Direct axis transient reactance (% on MVA rating) h. Direct axis sub-transient reactance (% on MVA rating) i. Auxiliary Power Requirement (MW)
iv. Generator Transformer	a. Type b. Rated capacity (MVA) c. Voltage Ratio (HV/LV) d. Tap change Range (+ % to - %) Percentage Impedance (Positive Sequence at Full load)

A.1.2 HYDRO ELECTRICAL

A.1.2.1 GENERAL

i. Site	Give location map to scale showing roads, railway lines, and transmission lines.
ii. Site map (To scale)	Showing proposed dam, reservoir area, water conductor system, fore-bay, power house etc.
iii. Submerged Area	Give information on area submerged, villages submerged, submerged forest land, agricultural land etc.
iv. Approximate period of construction.	

A.1.2.2 CONNECTION

i. Point of Connection	Give Single Line Diagram proposed connection with the Transmission System.
ii. Step up voltage for Connection	kV

A.1.2.3 STATION CAPACITY

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

A.1.2.4 GENERATING UNIT DATA

i. Operating Head (in Mtr.)
   a. Maximum
   b. Minimum
   c. Average.

ii. Turbine. — State Type and capacity

iii. Generator
   a. Type
   b. Rating (MVA)
   c. Terminal voltage (kV)
   d. Rated Power Factor
   e. Reactive Power Capability (MVAr) in the range 0.95 of leading and 0.85 of lagging
   f. Short Circuit Ratio
   g. Direct axis transient reactance (% on rated MVA)
   h. Direct axis sub-transient reactance (% on rated MVA)
   i. Auxiliary Power Requirement (MW)

iv. Generator Transformer
   a. Type
   b. Rated Capacity (MVA)
   c. Voltage Ratio HV/LV
   d. Tap change Range (+% to -%)
   e. Percentage Impedance (Positive sequence at full load).

A.2 STANDARD PLANNING DATA (TRANSMISSION)

Note: The compilation of the data is the internal matter of the Transmission Licensee, and as such the Transmission Licensee shall make arrangements for getting the required data from different departments of the Transmission Licensee to update its Standard Planning Data in the format given below:

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

A.3 STANDARD PLANNING DATA DISTRIBUTION

A.3.1 GENERAL

i. Area map (to scale)- Marking the area in the map of Orissa for which distribution licence is applied for.
ii. Consumer Data- Furnish categories of consumers, their numbers and connected loads.
iii. Reference to Electrical Divisions presently in charge of the distribution.

A.3.2 CONNECTION

i. Points of Connection- Furnish Single Line Diagram showing points of connection.
ii. Voltage of supply at points of connection
iii. Names of grid sub-station feeding the points of connection

A.3.3 LINES AND SUBSTATIONS

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

A.3.4 LOADS

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

A.3.5 DEMAND DATA (FOR ALL LOADS 5 MW AND ABOVE)

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

A.3.6 LOAD FORECAST DATA

i. Peak load and energy forecast for each category of loads for each of the succeeding 10 years.
ii. Details of methodology and assumptions on which forecasts are based.
iii. If supply is received from more than one Sub-station, the sub-station wise break up of peak load and energy projections for each category of loads for each of the succeeding 10 years along with estimated daily load curve.
iv. Details of loads 5 MW and above.
    a. Name of prospective consumer.
    b. Location and nature of load/complex.

APPENDIX- B

DETAILED PLANNING DATA

REFERENCE TO:
CHAPTER-3 SYSTEM PLANNING
CHAPTER-4CONNECTION CONDITIONS

B.1 DETAILED PLANNING DATA (GENERATION)

PART 1. FOR ROUTINE SUBMISSION

B.1.1 THERMAL POWER STATIONS (COAL BASED)

B.1.1.1 GENERAL

i. Name of Power Station.
ii. Number and capacity of Generating Sets (MVA).
iii. Ratings of all major equipments (boilers and major accessories, turbines, alternators, Generating Unit transformers etc.).
iv. Single Line Diagram of Power Station and switchyard.
v. Relaying and metering diagram.
vi. Neutral grounding of Generating Units.
vii. Excitation control (What type is used ? e.g. Thyristor, Fast Brush less ?).
viii. Earthing arrangements with earth resistance values.

B.1.1.2 PROTECTION AND METERING

i. Full description including settings for all relays and protection systems installed on the Generating Unit, Generating Unit transformer, auxiliary transformer and electrical motor of major equipment listed, but not limited to, under Sl.3 (General).
ii. Full description including settings for all relays installed on all outgoing feeders from Power Station switchyard, tie circuit breakers, incoming circuit breakers.
iii. Full description of inter-tripping of circuit breakers at the point or points of Connection with the Transmission System.
iv. Most probable fault clearance time for electrical faults on the User's system.
v. Full description of operational and commercial metering schemes.

B.1.1.3 SWITCHYARD

In relation to interconnecting transformers:

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

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

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

Lightning Arresters-

Technical data.

Communication-

Details of equipment installed at points of Connections.

Basic Insulation Level (kV)-

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

B.1.1.4 GENERATING UNITS

(a) Parameters of Generating Units:

i. Rated terminal voltage (kV).
ii. Rated MVA.
iii. Rated MW.
iv. Inertia constant (MW Sec./MVA) H.
v. Short circuit ratio.
vi. Direct axis synchronous reactance (% on MVA) X_d
vii. Direct axis transient reactance (% on MVA) X'_d
viii. Direct axis sub-transient reactance (% on MVA) X''_d
ix. Quadrature axis synchronous reactance (% on MVA) X_q
x. Quadrature axis transient reactance (% on MVA) X'_q
xi. Quadrature axis sub-transient reactance (% on MVA) X''_q
xii. Direct axis transient open circuit time constant (Sec) T'_{do}
xiii. Direct axis sub-transient open circuit time constant (Sec) T''_{do}
xiv. Quadrature axis transient open circuit time constant (Sec) T'_{qo}
xv. Quadrature axis sub-transient open circuit time constant (Sec) T''_{qo}
xvi. Stator resistance (Ohm) R_a
xvii. Stator leakage reactance (Ohm) X_l
xviii. Stator time constant (Sec).
xix. Rated field current (A).
xx. Open circuit saturation characteristic for various terminals giving the compounding current to achieve the same.

(b) Parameters of Excitation Control System:

i. Type of excitation.
ii. Maximum field voltage.
iii. Minimum field voltage.
iv. Rated field voltage.

v. Details of excitation loop in block diagrams showing transfer functions of individual elements using IEEE symbols.
vi. Dynamic characteristics of over-excitation limiter.
vii. Dynamic characteristics of under-excitation limiter.

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

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

B.1.2 HYDROELECTRIC STATIONS

B.1.2.1 GENERAL

i. Name of Power Station.
ii. No. and capacity of units. (MVA)
iii. Ratings of all major equipment.
    a. Turbines (HP).
    b. Generators (MVA).
    c. Generator Transformers (MVA).
    d. Auxiliary Transformers (MVA).
iv. Single Line Diagram of Power Station and switchyard.
v. Relaying and metering diagram.
vi. Neutral grounding of generator.
vii. Excitation control.
viii. Earthing arrangements with earth resistance values.
ix. Reservoir Data.
    a. Salient features
    b. Type of Reservoir
        (i) Multipurpose
        (ii) For Power

c. Operating Table with]
   (i) Area capacity curves, and
   (ii) Unit capability at different net heads

B.1.2.2 PROTECTION

i. Full description including settings for all relays and protection systems installed on the Generating Unit, generator transformer, auxiliary transformer and electrical motor of major equipment included, but not limited to those listed], under SI.3 (General).
ii. Full description including settings for all relays installed on all outgoing feeders from Power Station switchyard, tie breakers, incoming breakers.
iii. Full description of inter-tripping of breakers at the point or points of connection with the Transmission System.
iv. Most probable fault clearance time for electrical faults on the User's system.

B.1.2.3 SWITCHYARD

(a) Interconnecting Transformers:
   i. Rated MVA.
   ii. Voltage ratio.
   iii. Vector group.
   iv. Positive sequence reactance for maximum, minimum and normal tap. (% on MVA).
   v. Positive sequence resistance for maximum, minimum and normal Tap (% on MVA).
   vi. Zero sequence reactance (% on MVA).
   vii. Tap changer range (+% to -%) and steps.
   viii. Type of tap changer. (OFF/ON).

(b) Switchgear (including circuit breakers, isolators on all circuits connected to the points of Connection.)
   i. Rated voltage (kV).
   ii. Type of Breaker (MOCB/ABCB/SF6).
   iii. Rated short circuit breaking current (kA) 3 phases.

(c) Lightning Arresters:
   Technical data.

(d) Communications:
   Details of communications equipment installed at points of Connections.

(e) Basic Insulation Level (kV):
   i. Bus bar.
   ii. Switchgear.
   iii. Transformer bushings.
   iv. Transformer windings.

B.1.2.4 GENERATING UNITS

(a) Parameters of generator
   i. Rated terminal voltage (kV).

ii. Rated MVA.
iii. Rated MW.
iv. Inertia constant (MW sec/MVA) H.
v. Short circuit ratio.
vi. Direct axis synchronous reactance. (% On MVA) X_d.
vii. Direct axis transient reactance (% on MVA) X'_d.
viii. Direct axis sub-transient reactance (% on MVA) X''_d.
ix. Quadrature axis synchronous reactance (% on MVA) X_q
x. Quadrature axis transient reactance (% on MVA) X'_q
xi. Quadrature axis sub-transient reactance (% on MVA) X''_q
xii. Direct axis transient open circuit time constant (Sec) T'_{do}
xiii. Direct axis sub-transient open circuit time constant (Sec) T''_{do}
xiv. Quadrature axis transient open circuit time constant (Sec) T'_{qo}
xv. Quadrature axis sub-transient open circuit time constant (Sec) T''_{qo}
xvi. Stator Resistance (Ohm) R_a
xvii. Stator leakage reactance (Ohm) X_l
xviii. Stator time constant (Sec).
xix. Rated Field current (A).
xx. Open Circuit saturation characteristics of the generator for Various terminal voltages giving the compounding current to achieve this.
xxi. Type of Turbine.
xxii. Operating Head (Mtr.).
xxiii. Discharge with Full Gate Opening (cumecs).
xxiv. Speed Rise on total Load thrown off (%).

(b) Parameters of Excitation Control System:
As applicable to thermal Power Station**s**.

(c) Parameters of Governor:
As applicable to thermal Power Stations.

(d) Operational Parameter:
i. Minimum notice required synchronising a Generating Unit from de-synchronisation.
ii. Minimum time between synchronising different Generating Units in a Power Station.
iii. Minimum block load requirements on synchronising.

PART 2. FOR SUBMISSION ON REQUEST BY TRANSMISSUION LICENSEE

B.1.3 THERMAL POWER STATIONS

B.1.3.1 GENERAL

i. Detailed Project report.
ii. Status Report.
a. Land.
b. Coal.

c. Water.
d. Environmental clearance.
e. Rehabilitation of displaced persons.

iii. Techno-economic approval by CEA.
iv. Approval of State Government/Government of India
v. Financial Tie-up.

B.1.3.2 CONNECTION

i. Reports of studies for parallel operation with the Transmission System:
   a. Short circuit studies.
   b. Stability studies.
   c. Load flow studies.
ii. Proposed connection with Transmission System:
   a. Voltage.
   b. Number of circuits.
   c. Point of contact

B.1.4 HYDROELECTRIC POWER STATIONS

B.1.4.1 GENERAL

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

B.1.4.2. CONNECTION

i. Reports of Studies for parallel operation with the Transmission System:
   a. Short circuit studies.
   b. Stability studies.
   c. Load flow studies.
ii. Proposed connection with Transmission System:
   a. Voltage.
   b. Number of circuits.
   c. Point of Connection.

B.2 DETAILED SYSTEM DATA, TRANSMISSION

B.2.1 GENERAL

i. Single Line Diagram of the Transmission System down to 33 kV bus at grid Sub-station detailing:
   a. Name of Sub-station.
   b. Power Station, connected.
   c. Number and length of circuits.

d. Interconnecting transformers.
e. Sub-station bus layouts.
f. Power transformers.
g.Reactive compensation equipment.

ii. Sub-station layout diagrams showing:
a. Bus bar layouts.
b. Electrical circuitry, lines, cables, transformers, switchgear etc.
c. Phasing arrangements.
d. Earthing arrangements.
e. Switching facilities and interlocking arrangements.
f. Operating voltages.
g. Numbering and nomenclature:
i) Transformers.
ii) Circuits.
iii) Circuit breakers.
iv) Isolating switches.

B.2.2 LINE PARAMETERS (For all circuits)

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

B.2.3 TRANSFORMER PARAMETERS (For all transformers)

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

B.2.4 EQUIPMENT DETAILS (For all Sub-stations)

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

B.2.5 RELAYING AND METERING

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

B.2.6 SYSTEM STUDIES

i. Load flow studies (peak and lean load for maximum hydro and maximum thermal generation).
ii. Transient stability studies for three-phase fault in critical lines.
iii. Dynamic Stability Studies
iv. Short circuit studies (three phase and single phase to earth)
v. Transmission and distribution losses in the system**.**

B.2.7 DEMAND DATA (For all Sub-stations)

i. Demand Profile (Peak and lean load)

B.2.8 REACTIVE COMPENSATION EQUIPMENT

i. Type of equipment (fixed or variable).
ii. Capacities and/or inductive rating or its Operating Range in MVAr.
iii. Details of control.
iv. Point of connection to the system.

B.3 DETAILED PLANNING DATA, DISTRIBUTION

B.3.1 GENERAL

i. Distribution map (To scale) showing all lines up to 11 kV and sub-stations belonging to the Supplier.
ii. Single Line Diagram of Distribution System (showing distribution lines from points of connection with the Transmission System, 33/11 kV sub-stations, 11/0.4 kV sub-stations, consumer bus if fed directly from the Transmission System).
iii. Numbering and nomenclature of lines and sub-stations (Identified with feeding grid sub-stations of the Transmission System and concerned 33/11 kV sub-station of Supplier).

B.3.2 CONNECTION

i. Points of connection (Furnish details of existing arrangement of connection).
ii. Details of metering points of connection.

B.3.3 LOADS

i. Connected load - Furnish consumer details, Numbers of consumers category wise, details of loads 1 MW and above.
ii. Information on diversity of load and coincidence factor.
iii. Daily demand profile (current and forecast) on each 33/11 kV sub-station.
iv. Cumulative demand profile of Distribution System (current and forecast).

APPENDIX- C

C. OPERATIONAL PLANNING DATA

C.1 OUTAGE PLANNING DATA

REFERENCE TO: CHAPTER-5 OUTAGE PLANNING

C.1.1 DEMAND ESTIMATES

Item	To be Submitted By

i.	Estimated consumption of energy in million units at each Connection / External Interconnection Point on monthly basis and peak and lean demand in MW & MVAr at each Connection / External Interconnection Point on weekly basis for the period from April of next calendar year to March of following calendar year.	31st December of current calendar year.
ii.	Estimated consumption of energy in MU at each connection / External Interconnection Point on daily basis for month ahead and 24 hourly averaged demand estimates in MW & MVAr at each connection / External Interconnection Point for each day of the month ahead. (31 daily data items for MU for each Connection Point, 31 x 24 hourly data items for MW and 31 x 24 hourly data items for MVAr for each Connection Point).	15th of current month
iii.	Fifteen minutes block averaged demand estimates in MW & MVAr at each connection / External Interconnection Point for the day ahead. (96 data items for MW and 96 data items for MVAr at each connection / External Interconnection Point.)	10.00 Hours every day

C.1.2 ESTIMATES OF LOAD SHEDDING

Item		To be Submitted By
i.	Details of discrete load blocks that may be shed to comply with instructions issued by SLDC when required, from each Connection Point.	Soon after connection is made.

C.1.3 YEAR AHEAD OUTAGE PROGRAMME

(For the period April to March)

C.1.3.1 GENERATORS OUTAGE PROGRAMME

Item		To be Submitted By
i.	Identification of Generating Unit.	1st August each year
ii.	MW, which will not be available as a result of outage.	1st August each year
iii.	Preferred start date and start time or range of start dates and start times and period of outage.	1st August each year
iv.	If outages are required to meet statutory requirements, then the latest date by which outage must be taken.	1st August each year

C.1.3.2 YEAR AHEAD ERLDC'S OUTAGE PROGRAMME

(Affecting Transmission System)

Item		To be Submitted By
i.	MW, which will not be available as a result of outage from Imports through external connections.	31st December each year
ii.	Start date and start time and period of outage.	31st December each year

C.1.3.3 YEAR AHEAD CGP'S OUTAGE PROGRAMME

C.1.3.4 YEAR AHEAD DISTRIBUTION COMPANY'S OUTAGE PROGRAMME

Item	To be Submitted By
i. Loads in MW not available from any Connection Point.	1st August each year
ii. Identification of Connection Point.	1st August each year
iii. Period of suspension of drawal with start date and start time.	1st August each year

Item	To be Submitted By
i. MW, which will not be available as a result of outage.	1st August each year
ii. Start date and start time and period of outage.	1st August each year

C.1.3.5 THE TRANSMISSUION LICENSEE'S OVERALL OUTAGE PROGRAMME

Item	To be Submitted By
i. Report on proposed outage programme to ERLDC.	30th November each year
ii. Release of finally agreed outage plan.	1st March each year

C.2 GENERATION SCHEDULING DATA

REFERENCE TO:
CHAPTER-6 SCHEDULE AND DESPATCH

Item	To be Submitted By
i. Day ahead fifteen minutes block] MW & MVAr availability (00.00 - 24.00 Hours) of all generator units.	10.00 Hours every day.
ii. Day ahead fifteen minutes block] MW import/export from CGP's.	10.00 Hours every day.
iii. Status of Generating Unit excitation AVR in service (Yes/No).	10.00 Hours every day.
iv. Status of Generating Unit speed control system. Governor in service (Yes/No).	10.00 Hours every day.
v. Spinning reserve capability (MW)	10.00 Hours every day.
vi. Backing down capability with/without oil support (MW)	10.00 Hours every day.
vii. Hydro reservoir levels and restrictions	10.00 Hours every day.
viii. Generating Units hourly summation outputs (MW)	10.00 Hours every day.
ix. Day ahead fifteen minutes block MW entitlements from Central sector generation and Chukha Hydro Power Station from ERLDC.	11.00 Hours every day.

C.3 CAPABILITY DATA
REFERENCE TO: CHAPTER-5 FREQUENCY AND VOLTAGE MANAGEMENT

Item	To be Submitted By

i. Generators shall submit to the SLDC up-to-date capability curves for all Generating Units.	On receipt of request by the SLDC.
ii. CGPs shall submit to the licensee/SLDC net return capability that shall be available for export/import from Transmission System.	On receipt of request by the licensee/SLDC.

C.4 RESPONSE TO FREQUENCY CHANGE

REFERENCE TO: CHAPTER-5 FREQUENCY AND VOLTAGE MANAGEMENT

i. Primary response in MW at different levels of loads ranging from minimum generation to registered capacity for frequency changes resulting in fully opening of governor valve.
ii. Secondary response in MW to frequency changes.

C.5 MONITORING OF GENERATION

REFERENCE TO: CHAPTER-7 - MONITORING OF GENERATION AND DRAWAL OF POWER STATIONS OF 25 MW FOR DEDICATED LINE (TIE LINE) AND ABOVE 15 mw FOR NON-DEDICATED (NON-TIE) LINE.

Item	**To be Submitted By**
i. Generators shall provide hourly generation summation to SLDC.	To be submitted by real time basis
ii. CGPs shall provide hourly export/ import MW to SLDC.	To be submitted by real time basis
iii. Logged readings of generators to SLDC.	As required
iv. Detailed report of Generating Unit trippings on monthly basis.	In the first week of the succeeding month

C.6 ESSENTIAL AND NON-ESSENTIAL LOAD DATA

REFERENCE TO: CHAPTER-5 CONTINGENCY PLANNING

Item	**To be Submitted By**
i. Schedule of essential and non-essential loads on each discrete load block for purposes of load shedding.	As soon as possible after connection

APPENDIX- D

D. PROTECTION DATA

REFERENCE TO:
CHAPTER-9 PROTECTION

Item	**To be Submitted By**

i.	Generators/CGPs shall submit details of protection requirement and schemes installed by them as referred to in B.1. Detailed Planning Data under sub-Section "Protection and Metering".	As applicable to Detailed Planning Data
ii.	The licensee shall submit details of protection equipment and schemes installed by them as referred to in B.2. Detailed System Data, Transmission under sub-Section "Relaying and Metering" in relation to connection with any User.	As applicable to Detailed Planning Data

APPENDIX- E

E. METERING DATA
REFERENCE TO: CHAPTER-10 METERING

Item		**To be Submitted By**
i.	Generators/CGPs shall submit details of metering equipment and schemes installed by them as referred in B.1. Detailed Planning Data under sub-Section "Protection and Metering".	As applicable to Detailed Planning Data
ii.	The transmission licensee shall submit details of metering equipment and schemes installed by them as referred in B.2. Detailed System Data, Transmission under sub-Section "Relaying and Metering" in relation to connection with any User.	As applicable to Detailed Planning Data

CHAPTER-13

PERIODIC REPORT

A weekly report shall be prepared and issued by SLDC to all the Users. The weekly report shall contain the following.

(a) Frequency profile
(b) Voltage profile
(c) Major outage of Generating Unit
(d) Major outage of transmission line
(e) Grid disturbance

CHAPTER-14

MISCELLANEOUS

14.1 **Issue of Orders and Practice Directions**

Subject to the provisions of the Electricity Act, 2003, Indian Electricity Grid Code, and these Regulations, the Commission may from time to time issue orders and practice directions with regard to the implementation of these Regulations and procedure to be followed on Various matters, which the Commission has been empowered by these Regulations to determine and direct, and matters incidental or ancillary thereto.

14.2 **Saving of inherent power of the Commission**

(i) Subject to the provisions of the Act, Rules and regulations, the Commission, in special and extraordinary circumstances by recording the reasons in writing and in public interest may make such orders as may be necessary to meet the ends of justice.

(ii) Nothing in these Regulations shall bar the Commission from adopting in conformity with provisions of the Act, a procedure which is at variance with any of the provisions of these Regulations, if the Commission, in view of the special circumstances of a matter or a class of matters, deems it just or expedient for deciding such matter or class of matters.

(iii) Nothing in these Regulations shall, expressly or impliedly, bar the Commission dealing with any matter or exercising any power under the Act for which no regulations have been framed, and the Commission may deal with such matters, powers and functions in a manner, as it considers just and appropriate.

14.3 **Powers to Remove Difficulties**

If any difficulty arises in giving effect to any of the provisions of these Regulations, the Commission may, by general or special order, do anything not being inconsistent with the provisions of the Act, Indian Electricity Grid Code, these Regulations, which appears to it to be necessary or expedient for the purpose of removing the difficulties.

14.4 **Power to Amend**

The Commission may, at any time, add, vary, alter and modify the provisions of these Regulations through amendments.

By order of the Commission

(G.K.Dhall)
SECRETARY