Madhya Pradesh Electricity Grid Code (Revision-II), 2019

MADHYA PRADESH
India

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Rule
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Madhya Pradesh Electricity Grid Code (Revision-II), 2019Published vide Notification No. 834/MPERC/2019, dated 12.06.2019Last Updated 24th February, 2020No. 834/MPERC/2019. - In exercise of powers under Section 86(1) (h) of the Electricity Act, 2003, the Madhya Pradesh Electricity Regulatory Commission, hereby, specifies the Madhya Pradesh Electricity Grid Code (Revision- II), 2019.

Part I

General Code

1. Section 1

General

1. Short title, commencement and applicability. - (1) This code shall be called 'The Madhya Pradesh Electricity Grid Code (Revision-II), 2019 (No. RG- 14 (ii) of 2019)

(2)This Code shall come into force from the date of its publication in the Official Gazette of the Government of Madhya Pradesh.(3)The Madhya Pradesh Electricity Grid Code shall extend to the whole state of Madhya Pradesh and shall apply to State Load Dispatch Centre of Madhya Pradesh, every User who is connected to and/or uses the intra-State transmission System, STU and all transmission licensees of the intra-state Transmission System. The STU has the duty to implement

the Grid Code.(4)This Grid Code shall supersede the Madhya Pradesh Electricity Grid Code (Revision I), 2005 (which came into effect from 24.10.2005) and all its amendments.1.1Objectives. - The Grid Code governs the boundary between STU and Users as well as establishes guidelines for operation of facilities for those who are connected and will use the Transmission System. It lays down both the information requirements and procedures governing the relationship between STU and Users. The principal objectives of the Madhya Pradesh Electricity Grid Code are:• To provide clarity and certainty to the STU, MPPGCL, IPP/CPP/REG within MP, Discoms and any open access customers connected to the Transmission System by stating their respective roles, responsibilities and obligations with respect to the operation of the State Transmission System.• To improve the grid stability and set minimum standards of system performance.• To document the common knowledge or normal practice in writing for ease of reference and help in compliance.• To agree with generators what performance characteristics their plant must provide.• To improve co-operation by providing a mechanism for clear and consistent disclosure of all information.• To indicate how generation is to be scheduled and dispatched.1.2Structure of Madhya Pradesh Electricity Grid Code. - The Madhya Pradesh Electricity Grid Code has been divided into following parts:I. Management of Code. - This part is intended to ensure that all other sections of the Grid Code work together in the management of the Grid Code and establishment of a procedure for review of Grid Code to cater to inadvertent omissions and the modifications needed from time to time.II. Planning Code. - Planning Code includes sections on:(a)System Planning specifying the procedures to be applied by STU in the planning and development of the State Transmission System and by other Users connected or seeking connection to the State Transmission System. This section deals with procedure to be followed by STU in the development of the EHV Transmission System in the long term taking into account the requirements for new connection of generation and demand.(b)Connection Issues specifying the technical requirements and standards to be complied with by STU and other Users connected or seeking connection to the State Transmission System.III. Load Dispatch & System Operation Code. - Load Dispatch & System Operation Code includes sections on:(a)System Operation: Specifying the conditions under which STU shall operate the State Transmission System, the Generating Companies shall operate their plants and the Distribution Licensees shall operate their Distribution Systems in so far as necessary to protect the security and quality of supply and safe operation of the State Transmission System under both normal and abnormal operating conditions.(b)Schedule and Dispatch: Specifying the principles relating to the scheduling and dispatch of Generating Units and drawal by Discoms to meet State demand and Drawal allocation. The detailed operational procedure and associated commercial mechanism provided under "Balancing and Settlement Code" specified by the Commission.(c)Outage Planning: Specifying the procedures relating to the co-ordination of outages for scheduled maintenance of the Transmission Network, Generating Units and Distribution System that will use the State Transmission System.IV. Protection Code. - Protection Code specifies the requirement and co-ordination responsibility and minimum standards of protection that are required to be installed by Users of the State Transmission System.V. Metering Code. - Metering Code specifies the minimum operational and commercial metering to be provided for each User. It also sets out the requirement and procedures for metering.VI. Data Registration. - This contains the details of all the data required by STU, which is to be provided by the Users and vice versa.1.3Scope. - M.P. Electricity Grid Code is a document that defines the boundary between STU and Users and establishes the procedures for operation of facilities connected to the Transmission System.The Grid Code shall be complied with by STU in its

capacity as holder of the Transmission License and by State Sector Generating Station (SSGS), IPP and other user of STU's transmission system, Distribution Licensee, Open Access customers and non-licensee (like EHV consumers) connected with STU's transmission system, in the course of generation, transmission, supply and utilisation of electricity.1.4Implementation and Operation of the Grid Code.1.4.1The date of commencement of this code shall be the date of its publication in Madhya Pradesh Gazette and accordingly the concerned Utilities/Users shall commence its implementation.1.4.2The connectivity criteria and other provisions of this Grid Code shall be applicable to the Connections and equipments procured/provided for new works/replacements from the date from which the Grid Code is made effective.1.4.3The existing connections and equipment shall continue to operate till such time the OCC considers alterations necessary. However, operational aspects of the Grid Code shall have no such relaxation and shall apply with immediate effect.1.4.4The Grid Code shall extend to the whole state of Madhya Pradesh and shall apply to State Load Dispatch Centre of Madhya Pradesh, every User who is connected to and/State Load Dispatch Centre of Madhya Pradesh, every User who is connected to and/or uses the intra-State transmission System, STU and future transmission licensees. The STU has the duty to implement the Grid Code.1.4.5All Users are required to comply with Grid Code, which shall be enforced by STU. Users must provide STU reasonable rights of access; service and facilities necessary to discharge its responsibilities in the Users premises and to comply with instructions as issued by STU reasonably required to implement and enforce the Grid Code.1.4.6If any User fails to comply with any provision of the Grid Code, it shall, inform Grid Code Review Committee without delay of the reason for its non-compliance and shall remedy its non-compliance promptly. Consistent failure to comply with the Grid Code provisions may lead to disconnection of the User's plant and/or facilities. The disconnection on such ground shall not affect the STU's right to recover transmission and/or other charges during agreement period.1.4.7The operation of the Grid Code will be reviewed regularly by the Grid Code Review Committee in accordance with the provisions of the relevant section of the Grid Code.1.5General Requirements.1.5.1The Grid Code contains procedures to permit equitable management of day-to-day technical situations in the Electricity Supply System, taking into account a wide range of operational conditions likely to be encountered under both normal and abnormal circumstances. It is nevertheless necessary to recognise that the Grid Code cannot predict and address all possible operational conditions.1.5.2Users must therefore understand and accept that STU in such unforeseen circumstances may be required to act decisively to discharge its obligations under its License. SSGS, IPPs, REGs and Discoms shall provide such reasonable co-operation and assistance as STU may request in such circumstances.1.6Code Responsibilities1.6.1In discharging its duties under the Grid Code, STU has to rely on information, which Users supply regarding their requirements and intentions.1.6.2STU shall not be held responsible for any consequences that arise from its reasonable and prudent actions on the basis of such information.1.7Confidentiality1.7.1Under the terms of the Grid Code, STU will receive information from Users relating to their intentions in respect of their Generation or Supply businesses.1.7.2STU shall not, other than as required by the Grid Code, disclose such information to any other person without the prior written consent of the provider of the information.1.8Dispute Settlement Procedures1.8.1In the event of any dispute regarding interpretation of any part of the Grid Code provision between any Users and STU, the matter may be referred to the Commission for its decision. The Commission's decision shall be final and binding.1.8.2In the event of any conflict between any provision of the Grid Code and any contract or agreement between STU and Users, the

provision of the Grid Code shall prevail.1.9Communication between STU and Users1.9.1All communications between STU and Users shall be in accordance with the provision of the relevant section of the Grid Code and shall be made to the designated nodal officer appointed by STU.1.9.2Unless otherwise specifically required by the Grid Code all communications shall be in writing, save that where operation time scales require oral communication, these communications shall be confirmed in writing as soon as practicable.1.9.3The voice shall be recorded at SLDC and such record shall be preserved for a reasonable time to be decided.1.10Non-Compliance. - In case of persistent non-compliance of any of the stipulations of the MPEGC by any user/SSGS/STU/transmission licensee, the SLDC shall verify and take up the matter with the defaulting agency for expeditious termination of the non-compliance. In case of inadequate response to the efforts made by SLDC, the non-compliance shall be reported to the Commission. The Commission, in turn after due process, may order the defaulting agency for compliance, failing which; the Commission may take appropriate action. SLDC shall maintain appropriate records of such violations.1.11Availability of Madhya Pradesh Electricity Grid Code1.11.1The State Load Dispatch Centre and the State Transmission Utility shall put up the notified copy of Madhya Pradesh Electricity Grid Code on their respective web sites.1.12Repeal. - The Madhya Pradesh Electricity Grid Code published vide Notification No. 2506/MPERC/2005 dated 24/10/2005 in the Government of MP Gazette and read with all amendments thereto, as applicable to the subject matter of this code are hereby superseded.

2. Section 2

Definitions

Defined Term	Definition
Act	The Electricity Act 2003 (Central Act No. 36 of2003)
ADMS	Automatic Demand Management System
Ancillary Services,	In relation to power system (or grid)operation, the services necessary to support the power system (orgrid) operation in maintaining power quality, reliability andsecurity of the grid, e.g. active power support for loadfollowing, reactive power support, black start, etc;
Apparatus,	Electrical apparatus and includes all machines,fittings, accessories and appliances in which conductors areused.
Appendix	An Appendix to a section of the Grid Code.
Area of Supply	As defined in the concerned License.
Available Transfer Capability (ATC)	The transfer capability of the inter-controlarea transmission system available for scheduling commercialtransactions (through long term access, medium term open accessand short term open access) in a specific direction, taking intoaccount the network security. Mathematically ATC is the TotalTransfer Capability less Transmission Reliability Margin
Automatic Voltage	A continuously acting automatic excitationsystem to control the voltage

Regulator or AVR	of a Generating Unit as measured atthe Generator Terminals.
Backing Down,	SLDC instructions or WRLDC instructions conveyedthrough SLDC for reduction of generation from generating unitunder abnormal conditions such as high frequency, low systemdemand or network constraints.
Bilateral Transaction	A transaction for exchange of energy (MWh)between a specified buyer and a specified seller, directly orthrough a trading licensee or discovered at Power Exchangethrough anonymous bidding, from a specified point of injection toa specified point of drawal for a fixed or varying quantum ofpower (MW) for any time period during a month;
BSC	Madhya Pradesh Electricity Balancing andSettlement Code, 2015
Black Start Procedure	The process of recovery from a total or partialblackout of the State Transmission System.
Board	The Board refers to Madhya Pradesh StateElectricity Board (MPSEB).
Breakdown	An occurrence relating to equipment of supplysystem which prevents its normal functioning
Bulk Consumer	Any Consumer who avails supply at voltage of33kV or above
Capacitor	An electrical facility provided for generationof reactive power
Captive Power Plant (CPP)	A power plant set up by any person to generateelectricity primarily for his own use and includes a power plantset up by any co-operative society or association of persons forgenerating electricity primarily for use of members of suchco-operative society or association. Such power plant is notclassified as Independent Power Producer (IPP).
Central Generating Station	The generating stations owned by the companiesowned or controlled by the Central Government
CBIP	Central Board of Irrigation and power
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
Central Transmission Utility (CTU)	The utility notified by the Government of Indiaunder sub-section (1) of Section 38 of the Act
Congestion	A situation where the demand for transmissioncapacity exceeds the Available Transfer Capability
Commission/MPERC	Madhya Pradesh Electricity RegulatoryCommission.
Connection	The electric lines and electrical equipmentsused to effect a Connection of a User's (other than STU) systemto the State Transmission System.
Connectivity	The state of getting connected to theintra-State transmission system by a generating station includinga captive generating plant, a bulk consumer or an inter-Statetransmission licensee
Connection Agreement	An agreement between STU and a User setting outthe terms relating to the Connection to and/or use of the StateTransmission System.
Connection Conditions	The technical conditions to be complied with byany User having a

	Connection to the State Transmission System aslaid down in Section 5: "Connection Conditions" of theGrid Code.
Connection point	A point at which a Plant and/or Apparatusconnects to the Transmission/Distribution System.
Consumer	Any person who is supplied with electricity forhis own use by a licensee or the Government or by any otherperson engaged in the business of supplying electricity to thepublic under the Act or any other law for the time being in forceand includes any person whose premises are for the time beingconnected for the purpose of receiving electricity with the worksof a licensee, the Government or such other person, as the casemay be; or whose electricity supply has been temporarilydisconnected.
Discom Control Centre (DCC)	The Control Room established at each Discom'sHeadquarters with necessary Infrastructure and Human Resources(DCC shall be built, owned, operated and maintained by respectiveDiscom)
Declared Capacity (DC)	In relation to a generating station means, thecapability to deliver ex-bus electricity in MW declared by suchgenerating station irk relation to any time-block of the day orwhole of the day, duly taking into account the availability offuel or water, and subject to further qualification in therelevant Regulation
Demand	The demand of active power in MW and reactivepower in MVAR of electricity unless otherwise stated.
Demand response	Reduction in electricity usage by end customersfrom their normal consumption pattern, manually or automatically,in response to high Deviation charges being incurred by the Statedue to over drawl by the State at low frequency, or in responseto congestion charges being incurred by the State for creatingtransmission congestion, or for alleviating system contingency,for which such consumers could be given a financial incentive orlower tariff
Designated Officer	A person identified as having responsibility forinter user safety under section 13 of the Grid Code.
Dispatch Instruction	An instruction by SLDC to Generator (other thanCPP) under its control area to dispatch generation and toDistribution Licensee to regulate drawl in accordance with theScheduling & Dispatch procedure of Grid Code.
Deviation Charges	The charges computed as per the ratecorresponding to average Frequency of the Grid in a 15-minutetime block as specified by the CERC from time to time
Deviation Settlement Mechanism Regulations	Central Electricity Regulatory Commission(Deviation Settlement Mechanism and related matters)Regulations,2014 including any subsequent amendments thereof,.
Disconnection	The act of physically separating a User's or EHVConsumer's electrical equipment from the State TransmissionSystem.
Disturbance recorder	

	A device provided to record the behaviour of thepre-selected digital and analog values of the system parametersduring an Event.
Distribution Company/Discoms	Distribution Company/Discoms shall mean acompany engaged primarily in the business of distribution &supply of electricity in its area of supply including MadhyaPradesh Poory Kshetra Vidyut Vitran Company Limited (EastDiscom), Madhya Pradesh Madhya Kshetra Vidyut Vitran CompanyLimited (Central Discom) and Madhya Pradesh Paschim KshetraVidyut Vitran Company Limited (West Discom).
Distribution Licensee	Distribution Licensee means a Licenseeauthorised to operate and maintain a distribution system forsupplying electricity to the consumers in his area of supply.
Distribution System	The system of electric lines and "electricalequipment at voltage levels of 33kV and lower, including part ofa State Transmission System, used for supply of Electricity to asingle consumer or group of consumers.
Drawal	The algebraic sum of import and export ofelectrical energy and power both action & reactive fromRegional Grid. In respect of Discom, drawal means algebraic sumof import and export of electrical energy and power both activeand reactive from STU.
Drawal Schedule	The ex-Power Plant, MW that a Discom or an OpenAccess Customer is Scheduled to receive from a GeneratingStation, including Bilateral and Collective transactions fromtime to time.
Electricity Supply System	The combination of the State TransmissionSystem, Distribution System and Power Stations.
Entitlement	Share of a Discom (in MW and MWh) in theinstalled Capacity/output Capability of a Generating Station.
External Interconnection	Electric lines and electrical equipment used forthe transmission of electricity between the State TransmissionSystem and the Regional Transmission System and other Statesystems.
Extra High Voltage	Nominal voltage levels of higher than 33kV.
EHV Consumer	A person to whom electricity is provided and whohas a dedicated supply at 66kV or above.
Event	An unscheduled or unplanned occurrence on a Gridincluding faults, incidents and breakdowns.
Event Logging Facilities	A device provided to record the chronologicalsequence of operations, of the relays and other equipment
Forced Outage	An Outage of a SSGS or any of Power StationEquipment, generally due to sudden failure of one or more partsof equipment at a generating station, of which no notice can begiven by the Generator to STU and also include outage oftransmission line and any substation equipment of which no noticecan be given by STU or transmission licensee to Discom or viceversa.

Generator	A person or agency ' who generates electricityand who is subjected to Grid Code either pursuant to anyagreement with STU or otherwise.
Generating Unit	Generating unit means an electrical GeneratingUnit coupled to a turbine within a Power Station together withall Plant and Apparatus at that Power Station which relatesexclusively to the operation of that turbo-generator;
Generating Company	Generating Company means any company or bodycorporate or association or body of individuals, whetherincorporated or not, or artificial juridical person, which ownsor operates or maintains a generating station.
Generator Control Centre	The control room established at MPPGCL.Headquarters with necessary Infrastructure and Human Resources(GCC shall be built, owned, operated and maintained by MPPGCL);
Grid Code/Code	The set of principles and guidelines notified inaccordance with the terms of section 86 (1) (h) of theElectricity Act 2003.
Grid Contingencies	Abnormal operating conditions brought out bytripping of generating units, transmission lines, transformers orabrupt load changes or by a combination of the above leading toabnormal voltage and/or frequency excursions and/or overloadingof network equipment.
Grid Disturbance	Grid Disturbance is the situation wheredisintegration and collapse of grid either in part or full takeplace in an unplanned and abrupt manner, affecting the powersupply in a large area of the region.
Grid Code Review Committee/Committee	The Committee set up under Section 3:"Management of Grid Code" of the Grid Code.
Governor Droop	In relation to the operation of the governor ofa Generating Unit, the percentage drop in system frequency whichwould cause the Generating Unit under restricted/free governoraction to change its output from zero to full load
Grid Standards	The standards specified by the Authority underclause(d) of the Section 73 of the Act
High Voltage (HV)'	The voltage higher than 650 volts but notexceeding 33,000 volts under normal conditions.
IE Rules	Indian Electricity Rules 1956.
Independent Power Producer (IPP)	A generating company not owned or controlled bythe Central/State Government/their joint venture and suchgenerating company is not classified as a Captive Power Plant(CPP).
Indian Electricity Grid Code (IEGC)	A Regulation made by the Central ElectricityRegulatory Commission under clause (h) of sub-section (1) ofSection 79 read with clause (g) of sub-section (2) of Section 178of the Act..
Inter Connecting Transformer (ICT)	Transformer connecting EHV lines of differentvoltage levels.

Inter-State Generating Station (ISGS)	Inter-State Generating Station (ISGS) means aCentral generating station or other generating station, in whichtwo or more states have shares and whose scheduling is to becoordinated by RLDC
Inter-State Transmission System (ISTS)	(i) Any system forconveyance of electricity by means of a main transmission linefrom the territory of one state to another state(ii)The conveyance ofelectricity across the territory of an intervening state as wellas conveyance within the state, which is incidental to suchinter-state transmission of electricity.(iii)The transmission of electricity within theterritory of a state on a system built, owned, operated,maintained and controlled by the CTU;
Licensee	Licensee means a person who has been granted alicense under Section 14 of the Act
Load Crash	Sudden or rapid reduction of electrical loadconnected to a system that could be caused due to tripping ofmajor transmission line(s), feeder(s), power transformer(s) ornatural causes like rain etc.
Maximum Continuous Rating (MCR)	The maximum continuous output in MW at thegenerator terminals guaranteed by the manufacturer at ratedparameters.
Merit Order Operation	Discoms or M P Power Management Company limitedon behalf of Discoms (on receipt of requisition from DISCOMs)will give their requisitions on day ahead and real time basis asper individual Merit Order i.e. in ascending order of cost ofenergy (i.e. variable cost) of Inter State generating Station,State Area Generating Station excluding Hydro Power Stations,Independent Power Producer and other Long Term, Medium Term OpenAccess and intra state short term Open Access allocated toindividual Discom/M P Power Management Company Limited.
MPPTCL	Madhya Pradesh Power Transmission CompanyLimited.
MPPGCL	Madhya Pradesh Power Generating Company Limited.
MPPMCL	M P Power Management Company Limited
Net Drawl Schedule	The drawl schedule means the ex-Power Plant,Mega Watt that a Discom or an Open Access Customer is Scheduledto receive from an Electricity Generating Station, includingBilateral and collective transactions from time to time.
NTPC	NTPC Ltd.
OCCM	Operation and Co-ordination committee meeting
Open Access	The non-discriminatory provision for the use oftransmission lines or distribution system or associatedfacilities with such lines or system by any licensee or consumeror a person engaged in generation in accordance with theregulations specified by the Commission
Open Access Customer (OAC)	A person who has availed or intends to avail ofOpen Access under CERC (Open Access in Inter-State Transmission)Regulations 2008(as amended) and Madhya Pradesh ElectricityRegulatory Commission

	(Terms and Conditions for Intra State OpenAccess in Madhya Pradesh) Regulations, 2005 and amendmentsthereof or a Generating Company (including Captive GeneratingPlant) or a Licensee or a Consumer permitted by the MPERC toreceive supply of electricity from a person other thanDistribution Licensee of his area of supply, or a StateGovernment Entity authorized to sell or purchase electricity
Operating range	The operating range of frequency and voltage asspecified under the operating code
Outage	In relation to aGenerator/Transmission/Distribution facility, an interruption ofpower supply whether manually or by protective relays inconnection with the repair or maintenance of the SSGSTransmission facility or resulting from a breakdown or failure ofthe Transmission/Distribution facility/SSGS unit or defect in itsAuxiliary system
Peak Period	That period in a day when electrical demand isat its highest.
Planned Outage	An Outage in relation to a SSGS unit or PowerStation Equipment or Transmission facility which has been plannedand agreed with SLDC, in advance in respect of the year in whichit is to be taken.
PMU	Phasor Measurement Unit
Power Grid/PGCIL	The Power Grid Corporation of India Limited.
Pool Account	State account for (i) payments* regardingDeviation Charges (Deviation Charge Account) or (ii) reactiveenergy exchanges (Reactive Energy Account) (iii)CongestionCharge, as the case may be
Pooling Station	The substation wherepooling of generation of individual wind generator or solargenerator is done for interfacing with the next higher voltage:Provided that where there is no separate poolingstation for a wind/solar generator and the generating station isconnected through common feeder and terminated at a sub-stationof distribution company/STU/CTU, the sub- station of distributioncompany! STU/CTU shall be considered as the pooling station forsuch wind/solar generator, as the case may be.
PTW (Permit to Work)	Safety documentation issued to any person toallow work to commence on inter-user boundary after satisfyingthat all the necessary safety precautions have been established.
REG	Renewable Energy Generator
Rotational Shedding	Load Planned Disconnection of Customers on aRotational basis during periods when there is a significant shortfall of power required to meet the total Demand.
Renewable Energy Meter	Meter used for accounting and billing ofelectricity supplied to and from the consumer but excluding thosecovered under Interface Meters.
Reform Act	The Madhya Pradesh Vidyut Sudhar Adhiniyam, 2000(No. 4 of 2001)

Regional Transmission System	The combination of EHV electric lines andelectrical equipment owned or operated by Power Grid/utilities.
Section	A section or part of this Grid Code, which is,identified as covering a specific topic.
Shut Down	The condition of a Generating Unit where it isat rest or on barring gear isolated from grid or Transmissionfacility, which is at rest or isolated from Grid.
Spinning Reserve	The Capacities which are provided by devicesincluding generating stations or units thereof synchronized tothe grid and which can be activated on the direction of theSystem Operator and effect the change in active power.
State	The State of Madhya Pradesh.
State Load Dispatch Centre (SLDC).	The State Load Dispatch Centre means the centreestablished under sub section (1) of Section 31 of the Act toensure integrated operation of the power system in the state.
State Sector Generating Station (SSGS)	Any Power Station within the State includingPench hydel Power Station (operated by MPPGCL), exceptInter-State Generating Stations (ISGS) and Independent Powerproducer generating stations (IPPs)/Captive Power Producer(CPP)/REGS located within the State of MP in which state has itsshare
State Transmission System (STS)	The system of EHV electric lines and electricalequipment operated and/or maintained by STU or any TransmissionLicensee for the purpose of the transmission of electricitybetween Power Stations, External Interconnections, DistributionSystems and other users connected to it.
State Transmission Utility (STU)	The Board or Government Company specified assuch by the State Government under sub-section (1) of section 39of the Electricity Act.
Sub-LDC	Sub-LDC shall mean the Load. Dispatch Centresset up at Bhopal and Indore.
Supervisory Control and Data Acquisition (SCADA)	The combination of transducers, RTU,communication links and data processing systems, which providesinformation to the SLDC on the operational state of the StateTransmission System.
Synchronised	The condition where an incoming Generating Unitor System is connected to another System so that the voltage,frequencies and phase relationships of that Generating Unit orSystem, as the case may be, and the System to which it isconnected are identical and the terms "Synchronise" and"Synchronisation" shall be construed accordingly.
Transmission License/License	The License to be granted to STU by theCommission under Section 14 of the Electricity Act 2003.
Time Block	Block of 15 minutes each for which SpecialEnergy Meters record values of specified electrical parameterswith first time block starting at 00.00Hrs
Total Transfer	The amount of electric power that can betransferred reliably over the

Capability(TTC)	inter-control area transmissionsystem under a given set of operating conditions considering theeffect of occurrence of the worst credible contingency
Unscheduled Generation	Any generation that is in violation ofSLDC/WRLDC instructions and parameters described in relevantsections of the Grid Code.
User	A person, including Generating Stations withinMP, Transmission Licensees or Distribution Licensees within MPand open access customer who use the State Transmission Systemand who mush comply with the provisions of the Grid Code.
WAMS	Wide Area Management System
Western Region/Region	Region comprising of the States and UnionTerritory of Gujarat, Madhya Pradesh, Chhatisgarh, Maharashtra,Goa, Dadra & Nagar Haveli, Daman & Diu.
Western Regional Grid System	Western Regional Grid System means power systemsof SEBs/Utilities/IPP/CPPs of the States of the Western Regionand of NTPC & PGCIL having integrated operation.
WRPC	Western Regional Power Committee
WRLDC	Western Regional Load Dispatch Centre.

Note. - The words and expressions used in this Code but are not defined herein but defined in the Act or any other Regulations of the Commission shall have the same meaning as assigned to them under the Act or any other Regulation of the Commission.

3. Section 3

Management of The Grid Code3.1Introduction3.1.1STU is required to implement and comply with the Grid Code and periodically review the same and its implementation. For the above purpose a Grid Code Review Committee, as per section 3.4, shall be established.3.1.2Subject to the conditions in the next paragraph of this section, all revision in the Grid Code shall be made by consensus in the meeting of Grid Code Review Committee with majority of members voting for the revision. In the event of no consensus being reached, the matter shall be referred to the Commission for decision. All revisions in the Grid Code shall be approved by the Commission.3.1.3In any unusual situation where normal day-to-day operation is not possible without revision of some section(s) of the Grid Code, a provisional revision may be implemented before approval of Commission is received, but only after discussions at a special meeting of Grid Code Review Committee convened on emergency basis. The Commission shall be intimated at the earliest but not later than 15 days about the provisional revision by recorded means of communication.3.1.4The changes/revisions proposed by the Grid Code Review Committee shall be consistent/compatible with IEGC.3.1.5The Commission may issue directives requiring STU to revise, supplement or replace the Grid Code in such manner as may be specified in those directives and STU shall forthwith comply with any such directives.3.1.6This document defines the procedure to be followed by STU in maintaining the Grid Code and also in pursuing any change.3.2Objective. - The objective of this procedure is to define the method of managing the Grid Code, submitting and pursuing of any proposed change to the Grid

Code and the responsibilities of all Users to effect that change.3.3Responsibilities3.3.1STU will be responsible for managing and servicing the Grid Code.3.3.2STU shall establish and service the requirements of the Grid Code Review Committee in accordance with provisions of Section 3.5 of the Grid Code.3.3.3State Load Dispatch Centre shall discharge the functions assigned to it under the provisions of the Act and Grid code in an independent and unbiased manner:Provided that in event of a State Load Dispatch Centre being operated by the State Transmission Utility, as per first proviso of sub-section (2) of Section 31 of the Act, adequate autonomy shall be provided to the State Load Dispatch Centre for it to able to discharge its functions in accordance with the provisions of Madhya Pradesh Electricity Grid Code.3.4Grid Code Review Committee3.4.1The MPEGC Review Committee shall be constituted by STU. STU shall nominate one of its officers to be the Member Secretary & Convener of the Grid Code Review Committee.3.4.2STU will inform all Users of the names and addresses of the Committee Chairman and Member Secretary within 15 days of the approval of the Grid Code, and shall inform Users in writing of any subsequent changes.3.4.3WRPC, WRLDC, shall inform the Committee Member Secretary of the name and designation of their Committee Representative within 30 days of the approval of Grid Code by MPERC and shall inform the Committee Member Secretary, in writing, of any subsequent change.3.4.4The Committee shall be chaired by the STU in its capacity as the Transmission Licensee and consist of the following members:

(a) ManagingDirector of STU	- Chairman
(b) Managing Director of MPPGCL	- Member
(c) Managing Director of MPPMCL	- Member
(d) Managing Director of East Discom	- Member
(e) Managing Director of Central Discom	- Member
(f) Managing Director of West Discom	- Member
(g) Chief Engineer of STU	- Member Secretary & Convener
(h) In-charge SLDC	- Member
(i) One member representing transmission anddistribution licensee (other than STU/Discoms)	- Member
(j) One representative of IPP 1 CPP	- Member
(k) One representative from WRLDC	- Member

Further, one representative from WRPC may participate in the Committee as a special invitee.If the Committee considers it necessary to discuss/consult on any special issue with the Commission, the Committee may send an appropriate proposal to the Commission along with a copy of minutes of meeting wherein the issue/(s) was identified. The Commission may take up the issue for consideration in a manner as deemed fit to the Commission.3.4.5A member may nominate his alternative for one or more, meetings.Note. - Notice of the meeting would be served to all the members. However, the minimum quorum to review shall be of seven members (at least 4 member should be from (b) to (h) of para 3.4.4) including Chairman of the Committee (MD).3.5Grid Code Review Committee Proceedings3.5.1Convener of the Review Committee shall be responsible for arranging the meetings timely. The rules to be followed by the Committee in conducting its business

shall be formulated by the Committee themselves and shall be approved by MPERC. The Committee shall meet at least once in a year.3.5.2The functions of the Grid Code Review Committee are as follows:(a)To keep the Grid Code and its implementation under scrutiny and review.(b)To propose any revision, if necessary, in the Grid Code consequent of analysis report on major grid disturbance soon after its occurrence. The recommendations of the Committee may be submitted to Commission for approval and issuing directives to the Users for taking necessary remedial measures, as may be deemed fit, to prevent re-occurrence.(c)To approve guidelines for balancing the demand and supply through demand side management and under frequency relays.(d)To consider all requests for amendment to the Grid Code which any User makes.(e)To issue guidance on the interpretation and implementation of the Grid Code.(f)To examine problems/issues raised by the Users.3.5.3Sub-meetings may be held by STU with a User to discuss individual requirements and with groups of Users to prepare proposals for the Committee meeting. The Committee may set up sub committees for detailed studies of related problems.3.6Grid Code Review and Revisions3.6.1Written request for review/modification of MPEGC shall be sent by user/SSGS/Transmission licensee, who is seeking the amendment, to STU. If the request is sent to MPERC, the same shall be forwarded to STU.3.6.2The Commission shall reserve the right to review the Grid Code as and when required.3.6.3The Member Secretary shall present all proposals for revisions of the Grid Code to the Committee for its consideration.3.6.4STU shall send to the Commission following reports at the conclusion of each review meeting of the Committee:(a)A report on the outcome of such review;(b)Any proposed revisions to the Grid Code from time to time as STU reasonably thinks necessary for the achievement of the objectives of this Code;(c)All written representations or objections from Users arising during the review/consultation process.3.6.5All revisions to the Grid Code shall require the prior written approval of the Commission.3.6.6STU shall convey to all concerned, revisions to the Grid Code after approval by the MPERC and the same shall be incorporated in the subsequent version of the Grid Code.3.6.7The revision number and date of issue shall appear on every page of the Grid Code.3.6.8Every change from the previous version shall be clearly marked in the margin. In addition, a revision sheet shall be placed at the front of the revision that lists the number of every changed sub-section, together with a brief statement of change.3.6.9STU shall present proposals to the MPERC to allow relaxation, where Users have difficulties in meeting the Grid Code requirements.3.6.10STU shall make available a copy (other than service copy) of the respective parts of Grid Code in force for sale to any person requesting it.3.6.11STU shall keep an up-to-date list of the recipients and locations of all serviced copies of the Grid Code.3.7Functional Committees3.7.1The STU is responsible for servicing/implementation of Grid Code whereas the Grid Code Review Committee shall be responsible for management of Grid Code for any changes, modifications in the Grid Code. The STU shall constitute these functional committees and also the other committees as deems fit for the implementation of the Grid Code and inform to the Commission within a month of the publication of this Code:

(a) System Operation Code : Operation and Co-ordination Committee

(b) Protection Code : Protection Co-ordination Committee

(c) Transmission Metering : Transmission Metering Committee

3.7.2Operation and Co-ordination Committee (OCC). - Operation and Co-ordination Committee shall coordinate the implementation of Load Dispatch & System Operation Code to ensure that respective Generators and Distribution Licensees using State Transmission System discharge their obligations under the Grid Code.OCC shall be comprise of following members(i)Chief Engineer,

SLDC as Chairperson.(ii)One officer of SLDC not below the rank of SE as Member Secretary(iii)Chief Engineer (T&C), MPPTCL as Member(iv)Chief Engineer (Ping. & Design), MPPTCL as Member.(v)Chief Engineer (EHT), MPPTCL as Member(vi)Chief Engineer (O&M:Gen.), MPPGCL as Member(vii)Chief Engineer (O&M:Hydel), MPPGCL as Member(viii)One Member of the rank of C.E. from each DISCOM as Member(ix)Chief General Manager (PM), MP Power Management Co. as Member(x)Chief Engineer, NHDC as Member.(xi)One Member from each IPP(xii)One Member from Indian Railway being deemed Licensee(xiii)One member on rotation from Solar Generator having pooling station capacity within state of MP more than 50 MW(xiv)One member on rotation from Wind generator having pooling station capacity within state of MP more than 50 MW(xv)One member from each Transmission Licensee (other than MPPTCL)OCC shall meet once every two months and deliberate on all technical and operational aspects of Load Dispatch and System Operation and shall give their recommendations to the Grid Code Review Committee.The rules to be followed by the committee in conducting their business shall be formulated by the Committee itself and shall be approved by Grid Code Review Committee. It shall conduct the following functions.(a)Review of existing interconnection and equipment for alteration, if necessary, so as to comply with the Connection Conditions provided for in the Code.(b)Deliberation on connectivity criterion for voltage un-balance as specified in clause 6.1 of Performance Standards and taking remedial measure for cases failing to meet such criterion.(c)Review the load forecast and the methodology and assumptions made by each of the Discom/MPPMCL.(d)Review the load management through under frequency, time differential (df/dt) relays and ADMS.(e)Transmission system planning coordination for the State as a whole.(f)ABT Related issues i.e metering, energy accounting and scheduling under intra state ABT.(g)To discuss and resolve issues pertaining to improve availability real time data through SCADA.(h)Review the voice communication facility among SLDC and various state grid entities.(i)Review the reactive compensation in the State Transmission System and distribution network.(j)Review and analyze the grid disturbances and system restoration procedure(k)Review and finalize Outage Plan of State Transmission System(I)Review the installation of Disturbance Recorders, Event Loggers in the State Transmission System(m)Review & Study the implementation of free governing/restricted governing system for all eligible generating stations3.7.3Protection Co-ordination Committee (PCC). - Protection Co-ordination Committee shall coordinate the implementation of Protection Code to ensure that respective Users using State Transmission System, discharge their obligations under the Protection code.Protection Co-ordination Committee shall consist of following members:(i)Chairman who will be an officer designated by STU.(ii)Member Secretary who will also be an officer from STU.(iii)One representative from MPPGCL(iv)One representative from each Discom.(v)One representative from SLDC.3.7.4The rules to be followed by the Protection Co-ordination Committee in conducting their business shall be formulated by the Committee itself and shall be approved by Grid Code Review Committee. The Committee shall meet at least once in a year and conduct the following functions.(i)To keep Protection Code and its implementation under scrutiny & review.(ii)To consider all requests for amendment to the Protection code which any user makes.(iii)To publish recommendations for changes to the Protection code together with the reason for the change and any objection if applicable.(iv)To issue guidance on the interpretation & implementation of the Protection code.(v)To deliberate and decide various protection settings testing procedure and periodicity.(vi)To review and specify the minimum protection requirements for User's system connected to the State

Transmission System.(vii)To deliberate and prepare the Under Frequency & df/dt Load Shedding Schemes and the mechanism to be adopted for the same for various substations to ensure that the frequent tripping of same feeder is avoided.(viii)Preparation and finalisation of technical requirement of various protections, Disturbance recorders, Event Loggers.(ix)Review of progress of replacement of old/defective 33KV & 11KV CBs with DISCOMS to ensure selective trappings of 33KV & 11KV DISCOM feeders connected with EHV sub stations for reliability of supply system.(x)To review action taken by DISCOMS to reduce number of trappings on 33KV & 11KV feeders on which excessive trappings noticed.(xi)To review action taken by DISCOM for improving earthing system at 33/11KV sub stations constructed on rocky area to reduce fault clearing time for system safety.(xii)Review of healthiness of 220KV & 400KV Bus bar system at EHV sub stations.(xiii)To review major trappings/system disturbances caused at EHV Substation(xiv)To review healthiness of 33 KV Capacitor banks at EHV substations to ensure adequate reactive compensation to load.3.7.5Transmission Metering Committee (TMC). - Metering Committee shall be constituted as per the provisions of metering code. The rules to be followed by the Metering Committee in conducting their business shall be formulated by the Metering Committee itself and shall be approved by Grid Code Review Committee. The Metering Committee shall meet at least once in three months.3.8Non-Compliance & Derogation3.8.1State Transmission Utility and State Load Dispatch Centre shall be responsible for monitoring the compliance of the Users and Transmission System Licensees with the provisions, contained in Madhya Pradesh Electricity Grid Code and with the rules and procedures developed under such provisions:Provided that the State Transmission Utility and/or State Load Dispatch Centre shall not unduly discriminate against or unduly prefer any User or Transmission Licensee.3.8.2If any User fails to comply with any of the provision(s) of the Grid Code, it shall inform STU without delay of the reason for its non-compliance and shall remedy its noncompliance promptly.3.8.3Wrong declaration of capacity, non-compliance of SLDC's load dispatch instructions, non- compliance of SLDC's instructions for backing down without adequate reasons, non- furnishing data etc. shall constitute non-compliance of Grid Code and shall be subject to financial penalty as may be decided by the Commission.3.8.4In case of persistent non-compliance with the provisions of State Grid Code and/or with the rule and procedures developed under such provisions, such matter shall be reported to the Commission.Consistent failure to comply with the Grid Code may lead to disconnection of the User's plant and/or facilities.3.8.5State Load Dispatch Centre may give such directions and exercise such supervision and control as may be required for ensuring the integrated grid operations and for achieving the maximum economy and efficiency in the operation of power system in the State.3.8.6Every Transmission Licensee and User connected with the operation of the power system shall comply with the direction issued by the State Load Dispatch Centre.3.8.7If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the State grid or in relation to any direction given under the provisions of Madhya Pradesh Electricity Grid Code it shall be referred to the Commission for decision.Provided that pending the decision of the Commission, the direction of the State Load Dispatch Centre shall be complied with by the transmission licensee or User.3.8.8If any Transmission Licensee or any User fails to comply with the directions issued under Section 3.8.6, he shall be liable to penalty not exceeding rupees five lacs.3.8.9Derogation if any for any particular section or chapter of the Grid Code shall be with the express permission of the Commission for a specified time. Derogation of any requirement of the Grid Code shall be exception and not the norm, and will be allowed only when it is impossible and

not just difficult or inconvenient for the user to comply in the required time- scale. Failure to comply with fixed-time derogation by any User shall carry a financial penalty as may be decided by the Commission while allowing derogation.

Part II

Planning Code

4. Section 4

System Planning4.1Introduction4.1.1This section specifies the method for data submissions by Users to STU for the planning and development of the State Transmission System. This section also specifies the procedure to be applied by STU in the planning and development of the State Transmission System.4.1.2In accordance with Section 39(2)(b) of the Electricity Act, 2003, the State Transmission Utilities (STUs) shall discharge all functions of planning and coordination relating to intra-State transmission system with Central Transmission Utility, State Governments, Generating Companies, Regional Power Committees, Central Electricity Authority (CEA), licensees and any other person notified by the State Government in this behalf.4.1.3In accordance with Section 38(2)(d) of the Electricity Act, 2003, the State Transmission Utility (STU) shall inter-alia provide non-discriminatory open access to its transmission system for use by(a)any licensee or generating company on payment of the transmission charges; or(b)any consumer as and when such open access is provided by the State Commission under sub-section (2) of Section 42, on payment of the transmission charges and a surcharge thereon, as may be specified by the State Commission.4.1.4In accordance with Section 40(c) of the Electricity Act, 2003, the transmission licensee shall inter-alia provide non-discriminatory open access to its transmission system for use by(a)any licensee or generating company on payment of the transmission charges; or(b)any consumer as and when such open access is provided by the State Commission under sub-section (2) of Section 42, on payment of the transmission charges and a surcharge thereon, as may be specified by the State Commission.4.1.5A requirement for reinforcement or extension of the State Transmission System may arise for a number of reasons, including but not limited to the following:(i)Development on a User's system already connected to the State Transmission System.(ii)The introduction of a new Connection point between the User's system and the State Transmission System.(iii)Evacuation system for Generating Stations within or outside the State.(iv)Reactive Compensation.(v)A general increase in system capacity (due to addition of generation or system load) to remove operating constraints and maintain standards of security.(vi)Transient or steady state stability considerations.(vii)Cumulative effect of any of the above.4.1.6Accordingly, the reinforcement or extension of the State Transmission System may involve work at an entry or exit point (Connection point) of a User to the State Transmission System. Since development of all User's systems must be planned well in advance to permit consents and way leaves to be obtained and detailed engineering design/construction work to be completed, STU will require information from Users and vice versa. To this effect, the planning code imposes time scale, for exchange of necessary information between STU, and Users having regard, where appropriate, to the confidentiality of such information.4.2Objective4.2.1The provisions of this section are intended to enable STU to produce a plan in consultation with Users, to provide an efficient, coordinated, secure and economical State

Transmission System to satisfy requirement of future demand. The Planning Code provides the following;• Defines the procedure for the exchange of information between STU and a User in respect of any proposed User development on the User's system, which may have an impact on the performance of the User.• Details the information which STU shall make available to Users in order to facilitate the identification and evaluation of opportunities for use of or connection to State Transmission System;• Details the information required by STU from Users to enable STU to plan the development of its Transmission System to facilitate proposed User developments;• Specifies planning and design standards, which will be applied by STU in planning and development of the power system.4.3Planning Policy4.3.1STU would develop a perspective transmission plan for next 10 years for State Transmission System. These perspective transmission plans would be updated every year to take care of the revisions in load projections and generation capacity additions. The perspective plans shall be submitted to Commission for approval.4.3.2STU shall carry out annual planning process corresponding to a 5 year forward term for identification of major State Transmission System, which shall fit into national power plan formulated by Central Government long term plan developed by CEA and the 5 year plan prepared by Central Transmission Utility.4.3.3STU shall follow the following steps in planning:(i)Based on the forecasts provided by MPPMCL on behalf of Discoms, provide the details of the demand forecasts, data, methodology and assumptions on which the forecasts are based to the Commission. These forecasts would be annually reviewed and updated.(ii)Prepare a transmission plan for the State Transmission System compatible with the above load forecast and availability of power/generation capacity addition/deletion (De-commissioning of Units) provided by MPPMCL. This will include provision for VAR compensation needed in the State Transmission System.(iii)The reactive power planning exercise to be carried out by STU in consultation with WRLDC/WRPC/SLDC, Discoms, Programme for installation of reactive compensation equipment by STU & Discoms.(iv)As voltage management plays an important role in inter-state as well as intrastate transmission of energy, special attention shall be accorded, by STU, for planning of capacitors, reactors, SVC and Flexible Alternating Current Transmission Systems (FACTS), etc.(v)STU's planning department shall use load floW, short circuit, and transient stability study, relay coordination study and other techniques for transmission system planning.(vi)STU's planning department shall simulate the contingency and system constraint conditions for the system for transmission system planning.(vii)The planning criterion's are based on the security philosophy on which the Intra- State Transmission System has been planned. The security philosophy may be as per the Transmission Planning Criteria as per APPENDIX 'F' and other guidelines as given by CEA.(viii)All the equipments in the transmission system shall remain within their normal thermal and voltage ratings after a disturbance involving loss of any one of the following elements (called single contingency or 'N-1' condition), but without load shedding/rescheduling of generation- Outage of a 132kV or 110kV single circuit as the case may be,- Outage of a 220kV or 230kV single circuit as the case may be,- Outage of a 400kV single circuit,- Outage of a 400kV single circuit with fixed series capacitor(FSC),- Outage of an Inter-Connecting Transformer(ICT),- Outage of a 765kV single circuit,- Outage of one pole of HVDC bipole.4.3.4All the Users shall supply to STU, the desired planning data by 31st March every year to enable STU to formulate and finalise the plan by 30th September each year for the next 5 years.4.4Planning Standards and Procedures. - The State Transmission System planning and generation expansion planning shall be in accordance with the provisions of the Planning Criterion as per IEGC Clause 3.5. However, some planning parameters of the State Transmission System may vary according to

directives of MPERC.4.5Planning Responsibility4.5.1The primary responsibility of load forecasting within Discom's Area of Supply rests with respective Distribution Companies. The Distribution Companies shall determine peak load and energy forecasts of their areas for each category of loads for each of the succeeding 5 years and submit the same annually by 31st March to STU along with details of the demand forecasts, data, methodology and assumptions on which the forecasts are based along with their proposals for transmission system augmentation. The load forecasts shall be made for each of the prevalent as well as proposed interconnection points between STU and Discoms and shall include annual peak load and energy projections. The demand forecasts shall be updated annually or whenever major changes are made in the existing forecasts or planning. While indicating requirements of single consumers with large demands (1 MW or higher) the Distribution Company shall satisfy itself as to the degree of certainty of the demand materialising.4.5.2SSGS shall provide their generation capacity to STU for evacuating power from their power stations for each of the succeeding 5 years along with their proposals for transmission system augmentation and submit the same annually by 31st March to STU.4.5.3STU shall obtain Renewable Capacity Addition plan issued by New and Renewable Energy Department, (MPNRED), Govt. of Madhya Pradesh.4.5.4MPPMCL shall provide details of Long Term Access and Medium Term Open Access PPAs signed with ISGS/IPPs/REGs for the succeeding five years to STU annually by 31st March.4.5.5The planning for strengthening the State Transmission System for evacuation of power from outside state stations shall be initiated by STU.4.5.6Operation and Co-ordination Committee consisting of members from each Discom, STU and MPPGCL shall review and approve the load forecasts and the methodology followed by each of the Discoms.4.6Planning Data4.6.1To enable STU to conduct System Studies and prepare perspective plans for electricity demand, generation and transmission, the Users shall furnish data, to STU from time to time as detailed under Data Registration section as under:(a)Standard Planning Data (Generation)/Standard Planning Data (Distribution) (APPENDIX-A)(b)Detailed Planning Data (Generation)/Detailed Planning Data (Distribution) (APPENDIX-B)4.6.2To enable Users to co-ordinate planning design and operation of their plants and systems with the State Transmission System they may seek certain salient data of Transmission System as applicable to them, which STU shall supply from time to time as detailed under Data Registration section and categorized as:(a)Standard System Data (Transmission)(b)Detailed System Data (Transmission) (APPENDIX-E)4.6.3STU shall also furnish to all the Users, Annual Transmission Planning Report, Power Map and any other information as the Commission may prescribe.4.7Implementation of Transmission Plan. - The actual programme of implementation of transmission lines, substations, reactors and capacitors will be determined by STU in consultation of other transmission licensees. The STU/Transmission Licensee shall ensure the completion of these works in the required time frame.

5. Section 5

Connection Conditions5.1Introduction5.1.1STU and Users connected to, or seeking connection to State Transmission System (STS) shall comply with Central Electricity Authority (Technical Standards for connectivity to the Grid) Regulations, 2007 which specifies the minimum technical and design criteria and Central Electricity Regulatory Commission (Grant of Connectivity, Long - term Access and Medium - term Open Access in inter - State Transmission and related matters) Regulations, 2009 and subsequent amendment thereof.5.1.2Connection Conditions specify the

technical, design and operational criteria which must be complied with by any User connected to the State Transmission System.5.1.3The applicable technical standards for construction of electrical plants and electric lines connected to the intra-State transmission system shall be as per the standards notified by the Central Electricity Authority under clause (b) of Section 73 of the Act, to the extent not inconsistent with the provisions of this code.5.1.4The applicable safety requirements for construction, operation and maintenance of electrical plants and electric lines shall be as per the standards notified by the Authority under clause (c) of Section 73 of the Act, to the extent not inconsistent with the provisions of this code.5.2Objective. - The objective of this section is to ensure the following:(i)All Users or prospective Users are treated equitably.(ii)Any new Connection shall not impose any adverse effects on existing Users, nor shall a new Connection suffer adversely due to existing Users.(iii)By specifying minimum design and operational criteria, to assist Users in their requirement to comply with License obligations and hence ensure that a system of acceptable quality is maintained.(iv)The ownership and responsibility for all items of equipment is clearly specified in a schedule (Site Responsibility Schedule) for every site where a Connection is made.5.3Procedure for Application. - (i) The User shall submit the application containing all the information as may be reasonably required by STU.The information must contain the details of arrangements to made by user for drawl of grid energy.(ii)STU shall make a formal offer within 60 days of the receipt of the application.(iii)The offer shall specify and take into account any works required for the extension or reinforcement of the State Transmission System necessitated by the applicant's proposal and for obtaining any consent necessary for the purpose.(iv)If the prescribed time limit for making the offer against any application is not adequate, STU shall make a preliminary offer within the prescribed time indicating the extent of further time required for detailed analysis.(v)Any offer made by STU shall remain valid for a period of 60 days and unless accepted before the expiry of such period shall lapse thereafter.(vi)In the event of offer becoming invalid or not accepted by the applicant, STU shall not be required to consider any further application from the same applicant within 12 months unless the new application is substantially different from the original application.(vii)The applicant shall furnish the detailed planning data as per APPENDIX B(viii)STU shall be entitled to reject any application for connection to/or use of State Transmission System on the following conditions apart from others as considered reasonable:(a)If such proposed connection is likely to cause breach of any provision of its license or any provision of the Grid Code or any provision of IEGC or any provision criteria or any covenants, deeds or regulations by which STU is bound.(b)If the applicant does not undertake to be bound, in so far as applicable, by the terms of Grid Code.(c)If the applicant fails to give confirmation and undertakings according to this section.(d)If the details of arrangement of drawl of grid energy is not disclosed by the user in his application.5.4Connection Agreement. - A Connection Agreement (or the offer for a Connection Agreement) shall include, as appropriate, within its terms and conditions the following:(a)A condition requiring both parties to comply with the Grid Code.(b)Details of connection and/or use of system charges.(c)Details of any capital related payments arising from necessary reinforcement or extension of the system.(d)Diagram of electrical system to be connected.(e)General philosophy, guidelines etc on protection.(f)A Site Responsibility Schedule (Appendix G).(g)Details of arrangement of drawl of grid energy by the user.5.5Responsibilities for operational safety:5.5.1STU and the Users shall be responsible for safety as indicated in Site Responsibility Schedules for each connection point5.5.2For every Connection to the State Transmission System for which Connection Agreement is required, STU shall prepare a schedule of

equipment with information supplied by the respective Users. This schedule, called a Site Responsibility Schedule, shall indicate the following for each item of equipment installed at the Connection site.(i)The ownership of Plant/Equipment.(ii)The responsibility for control of Plant/Equipment.(iii)The responsibility for maintenance of Plant/Equipment.(iv)The responsibility for operation of Plant/Equipment.(v)The manager of the site.(vi)The responsibility for all matters relating to safety of persons at site.5.5.3The 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 User for compliance.5.5.4Single Line Diagrams. - (i) Single Line Diagram shall be furnished for each Connection Point by the connected user to SLDC. These diagrams shall include all HV connected equipment, location of ABT meters and the connections to all external circuits and incorporate numbering, nomenclature and labeling, etc. The diagram is intended to provide an accurate record of the layout and circuit connections, rating, numbering and nomenclature of HV apparatus and related plant.(ii)Whenever any equipment has been proposed to be changed, then concerned user shall intimate the necessary changes to STU and to all concerned.(iii)When the changes are implemented, changed Single Line Diagram shall be circulated by the user to SLDC/STU.5.5.5Site Common Drawings. - (i) Site Common Drawing will be prepared for each Connection Point and will include site layout, electrical layout, details of protection and common services drawings. Necessary details shall be provided by the users to STU.(ii)The detailed drawings for the portion of the user and STU at each Connection Point shall be prepared individually and exchanged between user and STU.(iii)If any change in the drawing is found necessary, either by user or STU, the details will be exchanged between user and STU as soon as possible.5.6System Performance5.6.1All equipment connected to the State Transmission System shall be of such design and construction to enable STU to meet the requirement of Standard of Performance. Discoms shall ensure that their loads do not cause violation of these standards.5.6.2Any user seeking to establish new or modified arrangement(s) for Grid connection and/or use of transmission system of STU shall submit the application in the form as may be specified by STU.5.6.3For every new/modified Connection sought, STU shall specify the Connection Point, technical requirements and the voltage to be used, along with the metering and protection requirements as specified in the Metering and Protection sections of the Code.5.6.4SSGS & IPP (except CPPs) shall make available to SLDC the up to date capability curves for all Generating Units, indicating any restrictions, to allow accurate system studies and effective operation of the State Transmission System. CPPs shall similarly furnish the net reactive capability that will be available for Export to/Import from State Transmission System.The State Transmission System rated frequency shall be 50.00 Hz and shall always remain within the 49.90- 50.05 Hz band as specified in IEGC.5.6.5The User shall however be subject to the Grid discipline prescribed by SLDC/WRLDC as per guidelines mutually agreed with WRPC/WRLDC.The variation of voltage at the inter connection point may not be more than the voltage range specified below:

Nominal(KV)	Maxim um(KV)	Minim um(KV)
765	800	728
400	420	380
220	245	198
132	145	122

33 36 30

5.6.6Discoms and Open access users shall ensure that their loads do not affect STU system in terms of causing any:

1. Unbalance in the phase angle and magnitude of voltage at the interconnection point beyond the limits prescribed by Transmission Performance Standards.

2. Harmonics in the system voltage at the interconnection point beyond the limits prescribed by Transmission Performance Standards.

STU may direct the Discoms to take appropriate measures to remedy the situation.5.6.7In the event of Grid disturbances/Grid contingencies in the Western Regional grid, STU shall not be liable to maintain the system parameters within the normal range of voltage and frequency.5.6.8Insulation Co-ordination of the User's equipment shall conform to values as specified by STU from time to time out of those as per applicable Indian Standards I Codes. Rupturing capacity of switchgear shall not be less than that specified by STU from time to time.5.6.9Protection schemes and metering schemes shall be as detailed in the Protection and Metering sections of the Code.5.6.10Detailed Performance Standards and its compliance requirements have been stated separately in the document namely "Madhya Pradesh Electricity Regulatory Commission (Transmission Performance Standards) Regulations, 2004" and subsequent revision drafted under the provisions of section 86 (1) (i) of the Electricity Act 2003.5.7Equipment of Users/State Transmission System at Connection Points :5.7.1Sub-station Equipment. - (i) All EHV sub-station equipments shall comply with Bureau of Indian Standards (BIS)/IEC/prevailing Code of practice.(ii)All equipment shall be designed, manufactured and tested and certified in accordance with the quality assurance requirements as per IEC/BIS standards.(iii)Each connection between User and STS shall be controlled by a circuit breaker capable of interrupting, at the connection point, the short circuit current as advised by STU in the specific Connection Agreement.5.7.2Fault Clearance Time (basic step operation time i.e. Zone 1 time): The fault clearance time of the equipment directly connected to the STS shall be as per the Protection Code defined under MPEGC.5.7.3Back-up protection shall be provided for required isolation/protection in the event of failure of the primary protection system provided to meet the fault clearance time requirements as defined in Protection Code of MPEGC.5.7.4If a Generating Unit is connected to the STS directly, it shall withstand, until clearing of the fault by back-up protection on the STS.5.7.5All users connected to STS shall provide protection system as specified in the Protection Code and this shall be made the part of the Connection Agreement.5.8Generating Units and Power Stations5.8.1A 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 5.6 above, subject to the design limitations specified by the manufacturer.5.8.2A generating unit shall be provided with the protection, as specified in the Protection Code and shall be made a part of the Connection Agreement.5.9Reactive Power Compensation5.9.1Reactive Power compensation and/or other facilities should be provided by User of the State Transmission System including the Distribution Licensee as far as possible in the low voltage systems close to the load points thereby avoiding the need for exchange of Reactive Power. to/from State Transmission

System and to maintain State Transmission System voltage within the specified range.5.9.2Switched Shunt Reactors at 400 kV may be provided to control temporary over voltage within the limits and this shall be made a part of Connection Agreement.5.9.3The addition of reactive compensation to be provided by the User shall be indicated by STU in the Connection Agreement for implementation.5.10Communication Facilities. - Reliable and efficient speech and data communication systems shall be provided by all the users to facilitate necessary communication and data exchange, and supervision/control of the grid by the SLDC, under normal and abnormal conditions. All Users and STUs shall provide Systems to telemeter power system parameter such as flow, voltage and status of switches/transformers taps etc. in line with interface requirements and other guideline made available by SLDC. All Users shall provide the required facilities at their respective ends and SLDC and this shall be indicated in the Connection Agreement.5.11System Recording instruments. - Recording instruments such as Data Acquisition System/Disturbance Recorder/Event Logger/Fault Locater/WAMS/PMU (including time synchronization equipment) shall be provided in the STS for recording of dynamic performance of the system. All Users and STU shall provide all the requisite recording instruments and shall always keep them in working condition.5.12Procedure for Site Access, Site operational activities and Maintenance Standards. - The Connection Agreement will also indicate any procedure necessary for Site access, Site operational activities and maintenance standard for STU equipment at User premises and vice versa.5.13Schedule of assets of State Transmission Grid. - STU shall submit annually to SERC by 30th September each year a schedule of transmission assets which constitute the State Grid i.e. State Transmission System as on 31st March of that year indicating ownership on which SLDC has operational control and responsibility.5.14Connection Point5.14.1State Sector Generating Station (SSGS) Voltage may be 400/220/132kV or as agreed with STU. Unless specifically agreed with STU the Connection point shall be the outgoing feeder gantry of Power Station Switchyard.All the terminals, communication and protection equipment owned by SSGS within the perimeter of the Generator's site shall be maintained by the SSGS. The provisions for the metering system shall be as per the Metering Code. The other User's equipment shall be maintained by respective Users. From the out going feeders' gantry onwards, all electrical equipment shall be maintained by STU.5.14.2Distribution Company. - Voltage may be LV side of power transformer i.e. 33 or 11kV or as agreed with STU. For EHV consumer directly connected to transmission system, voltage may be 220kV or 132kV.The Connection point shall be the outgoing feeder gantry/cable termination on transmission tower/pole at STU's substation. STU shall maintain all the terminals, communication and protection for the metering system as per the Metering Code. From the outgoing feeder gantry/transmission line cable terminal structure onwards, all electrical equipment shall be maintained by the respective Distribution Company.5.14.3Western Regional Transmission System. - For the Western Regional Transmission System, the Connection, protection scheme, metering scheme and the voltage shall be in accordance with the provisions of IEGC.5.14.4IPPs, CPPs, EHV Consumers and Open access users. - Voltage may be 220/132kV or as agreed with STU.When sub-stations are owned by IPPs, CPPs, EHV Consumers or the Open access users, theConnection point shall be the outgoing feeder gantry on their premises.5.15Cyber Security. - All utilities shall have in place, a cyber security frame work to identify the critical cyber assets and protect them so as to support reliable operation of the grid.5.16Connectivity Standards applicable to Wind generation and Solar Generating Station using inverters. - The connectivity standards specifying the technical equipments for wind generators and solar generating stations using inverters to be synchronized

with the grid at 33 KV or above shall be capable of the following:(i)Harmonics current injection from a generating station shall not exceed the limits specified in Institute of Electricals and Electronics Engineers (IEEE) standard 519.(ii)The Generating stations shall not inject DC current greater than 0.5% of the full rated output at the interconnection point(iii)The generating station shall not introduce flicker beyond the limits specified in IECD 61000.(iv)Wind generating stations connected at 33 KV and above shall be capable of supplying dynamically varying reactive power support, so as to maintain power factor within limits of 0.95 lagging to 0.95 leading. Similarly, solar generation stations have to maintain power factor within limits of 0.90 lagging to 0.90 leading.(v)Wind generating stations and solar generating stations shall have fault ride through capability of not less than 300 mili -seconds so that grid is not destabilized due to sudden outage of generation in the event of a grid disturbance.(vi)The total harmonic distortion for voltage at the connection point shall not exceed 5% with no individual harmonic higher than 3% and the total harmonic distortion for current drawn from the transmission system at the connection point shall not exceed 8%. The above measurement of Harmonics Distortion has to be carried out every six monthly and shall be reported to STUs/Licensees.5.17Data Requirements. - Users shall provide STU with data for this section as specified in the Data Registration section. Unless otherwise agreed in Connection Agreement, the equipments for data transmission and communication shall be operational and maintained by the user in whose premises they are installed irrespective of ownership.

6. Section 6

System Security Aspects6.1System Security Aspects6.1.1All Users shall endeavour to operate their respective power system and generating stations in synchronism with each other at all times, such that the whole State Transmission System operates as synchronised system as integrated part of Western Regional Grid. STU shall endeavour to operate the inter state links so that inter state transfer of power can be achieved smoothly when required. Security of the power system and safety of power equipment shall enjoy priority over economically optimal operations.6.1.2All switching operations, whether affected manually or automatic, will be based on regulatory provisions of IEGC, MPEGC and CEA regulations.6.1.3No part of the State Transmission System shall be deliberately isolated from the integrated Grid, except(a)Under an emergency, and conditions in which such isolation would prevent a total Grid collapse and/or enable early restoration of power supply,(b)When serious damage to a costly equipment is imminent and such isolation would prevent it.(c)For safety of Human Life.(d)When such isolation is specifically advised by SLDC and(e)On operation of under frequency/is-landing scheme as approved by WRPC/MPERC.All such insolations shall be either as per standing guidelines approved by WRPC/MPERC or shall be put up in the Grid Code Review Committee for ratification. Complete synchronisation of integrated Grid shall be restored, as soon as the conditions again permit it. The restoration process shall be supervised by SLDC and no transmission elements shall be synchronized without prior consent of SLDC/Sub- LDC.All operational instructions given by RLDC and SLDC shall have unique codes which shall be recorded and maintained as specified in Central Electricity Authority (Grid Standards) Regulations, 2010 and subsequent amendment thereof.6.1.4The 66kV and above transmission lines and 1CTs (except radial lines which do not affect the operation of the Grid) shall not be deliberately opened or removed from service at any time except when advised by SLDC or

with specific and prior clearance of SLDC. Where prior clearance from SLDC is not possible it should be intimated to SLDC at the earliest possible time after the incident.6.1.5Any tripping, whether manual or automatic, of any of the elements mentioned above, shall be precisely reported to SLDC at the earliest say within ten minutes of 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 elementary restoration at the earliest. The information/data including disturbance recorder, sequential event recorder outputs etc. containing the sequence of tripping and restoration shall be sent to SLDC for the purpose of analysis.6.1.6All Coal/lignite based thermal generating units of 200 MW and above, Open Cycle Gas Turbine/Combined Cycle generating stations having gas turbines of capacity more than 50 MW each and all hydro units of 25 MW and above (unless scheduled for De-commissioning/retirement within 3 years), which are synchronized with the grid, irrespective of their ownership, shall have their governors in operation at all times in accordance with the following provisions:Governor Action. - (i) Following Coal/lignite based thermal and hydro (except those with upto three hours poundage) generating units shall be operated under restricted governor mode of operation with effect from the date given below:(a)Coal/lignite based thermal generating units of 200 MW and above,

1. Software based Electro Hydraulic Governor (EHG) system : 01.08.2010

2. Hardware based EHG system: 01.08.2010

(b)Hydro units of 25 MW and above: 01.08.2010(c)Open Cycle Gas Turbine/Combined Cycle generating stations having gas turbines of capacity more than 50 MW each: with effect from 01.10.2017.(ii)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 to a level below 50.00 Hz. (For example, if grid frequency changes from 49.9 to 49.95 Hz, or from 49.95 to 49.99 Hz there shall not be any reduction in generation). For any fall in grid frequency, generation from the unit should increase as per generator droop upto a maximum of 5% of the generation subject to ceiling limit of 105% of the MCR of the unit having regard 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.(c)If any of these generating units is required to be operated without its governor in operation as specified above, the WRLDC through SLDC shall be immediately advised about the reason and duration of such operation. All governors shall have a droop setting of between 3% and 6%.(d)After stabilization of frequency around 50 Hz, the MPERC may review the above provision regarding the restricted governor mode of operation and free governor mode of operation may be introduced.(iii)All other generating units including the pond age upto 3 hours, wind and solar generators and Nuclear Power Stations shall be exempted from Sections 6.1.6, 6,1.7, 6.1.8 and 6.1.9 till the MPERC 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.6.1.7Facilities available with/in Load Limiters, Automatic Turbine Run-up System (AIRS), Turbine Supervisory Coordinated Control system etc. shall not be used to suppress the normal governor action in any manner. No dead bands and time delays shall be deliberately introduced except as specified in para 6.1.6 above:Provided that periodic

checkups by third party should be conducted at regular interval once in two years through independent agencies selected by SLDC. The cost of such tests shall be recovered by the SLDC from the Generators. If deemed necessary by SLDC, the test may be conducted more than once in two years.6.1.8All coal/lignite based thermal generating units of 200 MW and above, Open Cycle Gas Turbine/Combined Cycle generating stations having gas turbines of more than 50 MW each and all hydro units of 25 MW and above operating at or upto 100% of their Maximum Continuous Rating (MCR) shall have the capability of (and shall not in any way be prevented from) instantaneously picking up to 105%, 105% and 110% of their MCR, respectively, when the 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.For the purpose of ensuring primary response, SLDCs shall not schedule the generating station or unit (s) thereof beyond ex-bus generation corresponding to 100% of the Installed capacity of the generating station or unit(s) thereof. The generating station shall not resort to Valve Wide Open (VWO) operation of units whether running on full load or part load, and shall ensure that there is-margin available for providing Governor action as primary response. In case of gas/liquid fuel based units, suitable adjustment in Installed Capacity should be made by SLDCs for scheduling in due consideration of prevailing ambient conditions of temperature and pressure vis-a-vis site ambient conditions on which installed capacity of the generating station or unit(s) thereof have been specified:Provided that scheduling of hydro stations shall not be reduced during high inflow period in order to avoid spillage:Provided further that the VWO margin shall not be used by SLDC to schedule Ancillary Services.6.1.9All Users and SLDC shall take all possible measures to ensure that the grid frequency always remains within the 49.90-50.05 Hz band or as specified by CERC from time to time(i)Except under an emergency, or to prevent an imminent damage to costly equipment, no User shall suddenly decrease/increase its generation without prior intimation to the SLDC. Similarly, no User shall cause a sudden decrease/increase in its load due to imposition/lifting of power cuts etc., without prior intimation to and consent of the SLDC, particularly when frequency is deteriorating.(ii)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 capacity is required to be operated without its AVR in service, the SLDC shall be immediately intimated about the reason and duration, and its concurrence obtained. 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/SLDC/WRPC from time to time. WRPC/SLDC will be allowed to carry out checking of PSS and further tuning it, wherever considered necessary.6.1.10Provision of protections and relay settings shall be coordinated in the State Transmission System, as per a plan to be separately finalised by the Protection Coordination Committee.6.1.11Various steps shall be taken for frequency management (Section 9) and voltage management (Section 9) so as to ensure system security from these considerations.6.1.12All Generating Units with capacity of 200MW and above, sub-stations with operating voltage of 400kV & above and important 220kV sub-stations with 220/132kV transformation capacity above 250MVA shall be provided with the facilities of Disturbance Recorders (DRs) and Event Loggers (ELs). STU shall submit time-bound plan to install DRs wherever it is required as per this Code.6.1.13All Users shall provide automatic under-frequency and df/dt relays for load shedding in their respective

premises, to arrest frequency decline that could result in a collapse/disintegration of the grid, as per the plan separately finalised by the concerned RPC forum, and shall ensure its effective application to prevent cascade tripping of generating units in case of any contingency. All Users shall ensure that the under frequency load shedding/and df/dt load shedding is-landing schemes are functional. However, in case of extreme exigencies, under-frequency relays/df/dt relays may be temporarily kept out of service with prior consent of SLDC. SLDC shall promptly inform RPC about the locations at which these relays are temporarily out of service. SLDC shall also inform RPC about instances when the desired load relief is not obtained through these relays in real time operation.6.1.14SLDC shall carry out periodic inspection of the under frequency relays and maintain proper records of the inspection. SLDC shall furnish monthly report of UFR and df/dt relay operation In their respective system to the respective WRPC.6.1.15All Users and STU/SLDC, shall also facilitate identification, installation and commissioning of System Protection Schemes (SPS) (including inter-tripping and run back) in the power system to operate the transmission system closer to their limits and to protect against situations such as voltage collapse and cascade tripping, tripping of important corridors/flow-gates etc. Such schemes would be finalized by the Grid Code Review Committee, and shall always be kept in service: If any SPS is to be taken out of service, permission of SLDC shall be obtained indicating reason and duration of anticipated outage from service.6.1.16Procedures shall be developed to recover from partial/total collapse of the grid and periodically updated in accordance with the requirements given under section 12.4. These procedures shall be followed by all the Users to ensure consistent, reliable and quick restoration.6.1.17Each User shall provide adequate and reliable communication facility with SLDC to ensure exchange of data/information necessary to maintain reliability and security of the grid. Wherever possible, redundancy and alternate path shall be maintained for communication along important routes, e.g. User to SLDC.6.1.18The Users shall send information/data including disturbance recorder/sequential event recorder output etc. to SLDC for purpose of analysis of any grid disturbance/event. No User shall block any data/information required by the SLDC for maintaining reliability and security of the grid and for analysis of an event.6.1.19Special requirements for Solar/Wind generators. - System operator (SLDC/RLDC) 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 shill be provided for transfer of information to concerned SLDC and RLDC :(i)SLDC/RLDC 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.(ii)During the wind generator start-up, the wind generator shall ensure that the reactive power drawl (inrush currents in case of induction generators) shall not affect the grid performance.

Part III

Load Dispatch & System Operation Code

7. Section 7

Operational Planning7.1Introduction. - This section describes the process by which the SLDC carries out the operational planning and demand control procedures to permit reduction in Demand for any reason.7.2Objective. - The detailed provision is required to enable SLDC to achieve a reduction in demand to avoid Operating problems on all or part of the State Transmission System. SLDC will utilise Demand Control in a manner, which does not unduly discriminate against any one or group of customers.7.3Demand Estimation7.3.1The long-term demand estimation/load forecast (for more than 1 year) shall be done by the DISCOMs/MPPMCL in accordance with the provisions of Section 4. SLDC shall be provided with a copy of the same as and when it is finalised. Demand Estimation for period up to 1 year ahead shall be done by SLDC.7.3.2MPPMCL on behalf of Discoms shall provide to the SLOG their estimates of demand for the year ahead on month-basis for the next financial year by 15th November each year. Discoms shall also provide daily demand on weekly basis by last working day of previous week and monthly basis by 25th for the next month. The 15 minute block wise day -ahead demand estimates shall be provided by MPPMCL/DISCOMs to SLDC by 09.00 hrs of the current day.7.3.3Discoms shall provide to SLDC estimates of load that may be shed when required, in discrete blocks with the details of arrangements of such load shedding.7.3.4Discoms shall also furnish realistic category-wise demand for their respective companies along with details of essential loads, supply hours to be maintained in rural areas, details of power cuts imposed or to be imposed and specific requirements, if any.7.3.5The demand estimation shall cover active power as well as reactive power requirements fore casted for each substation.7.3.6The SLDC would update the demand forecast (in MW as well as MWh) on Daily/Weekly/Monthly basis, which would be used in the day-ahead scheduling.Attention shall also be paid by SLDC in demand forecasting for special days such as important festivals and National Holidays having different crests and troughs in the daily load-curve as compared to normal weather conditions & days.7.3.7DISCOMs/MPPMCL and SLDC would maintain a historical database for the purpose of Demand Estimation and shall be equipped with the state-of-the-art tools such as Energy Management System (EMS) for demand forecasting.7.3.8SLDC shall furnish data for and participate in deliberations of data for load generation balance or Annual Demand, availability and shunt capacitors requirement studies of WRPC. It shall take into consideration their reports for demand estimation.7.4Demand Control7.4.1Primarily the need for demand control would arise on account of the following conditions:• Variations in demand from the estimated or fore casted values, which cannot be absorbed by the grid, and• Unforeseen generation/transmission outages resulting in reduced power availability, and• Heavy reactive power demand causing low voltages.7.4.2SLDC shall match the consolidated demands of the Discoms with consolidated generation availability from SSGS, ISGS, IPP/CPP and other sources and exercise the Demand Control to ensure that there is a balance between the energy availability and the Discoms demand plus losses plus the required reserve.7.4.3SLDC would maintain a historical database for the purpose of Demand Estimation and shall be equipped with the state-of-the-art tools such as Energy Management System (EMS) for short-term demand estimation to plan in advance, as to how the load would be met without overdrawing from the grid.7.4.4SLDC shall advice STU for planning of Automatic load shedding schemes and rotational load shedding through installation of Under Frequency Relays.The guidelines for under frequency load shedding and df/dt relays shall be prepared, in accordance with the instructions from WRLDCNVRPC, by the Operation and Co-ordination Committee and shall be

approved by the Grid Code Review Committee.7.4.5The particulars of feeders or group of feeders at a STU sub-station which shall be tripped under under-frequency load shedding scheme whether manually or automatic on rotational basis or otherwise shall be placed on Notice board and will also available at the sub-station for information of the consumer(s).7.4.6Demand control can also be exercised by the SLDC through direct circuit breaker tripping affected from SLDC using RTUs and under frequency detection by SLDC SCADA or through telephonic instructions. No demand shed by operation of under frequency relays shall be restored without specific directions from SLDC.7.4.7Rotational Load Shedding Schemes using Under Frequency Relay (UFR) shall be prepared time to time by the Utility in accordance with the guidelines/instructions issued by WRLDC/WRPC. The STU shall inform such decisions to MPERC with in seven days from the issue of instructions by WRLDC/WRPC.7.5Demand Disconnection. - (a) All users/distribution licensee shall initiate action to restrict the drawal of its control area from the grid, within the net drawal schedule.(b)All Users/distribution licensee shall ensure that requisite load shedding is carried out in its control area so that there is no over drawal.(c)The SLDC through respective 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 inter reptile loads) etc., to reduce over drawl in order to comply para 7.5 (a) and (b).(d)In order to maintain the frequency within the stipulated band and maintaining the network security, the inter reptile 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 identified at the RPC level. 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 RLDC may direct SLDC to decrease drawal of its control area by a certain quantum. Such directions shall immediately be acted upon by. Users/Distribution Licensees.(e)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 deviation from the schedule by the Users/Distribution Licensees/Injecting Utility at different overdrawal/Under Drawal/Over-Injection/Under Injection conditions depending upon the severity. The SLDC shall ensure immediate compliance of these directions and violation of SLDC's directions shall intimated to the Commission through monthly report.(f)All Users/distribution licensee 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 with drawl of congestion shall be in accordance with Central Electricity Regulatory Commission (Measures to relieve congestion in real time operation) Regulations, 2009.(g)The measures taken by the Users/Distribution licensee shall not be withdrawn as long as the frequency remains at a level lower than the limits or congestion continues, unless specifically permitted by the RLDC/SLDC.7.6Load Crash7.6.1In the event of load crash in the system due to weather disturbance or any other reasons, the situation would be controlled by the SLDC by the following methods.:(i)Backing down of hydel stations for short period immediately(ii)Lifting of the load restrictions, if any(iii)Exporting the power to neigh boring regions(iv)Backing down of thermal stations with a time lag of 5-10 minutes for short period(v)Closing down of hydel units (subject to non spilling of water and effect on irrigation)(vi)Backing down of Renewable Energy Power PlantsThe above methodology shall be

reviewed from time to time in Operation and Co- ordination Committee.7.6.2While implementing the above, the system security aspects should not be violated as per relevant provisions under IEGC and the Grid Code. Further, in case of hydro generation linked with irrigation requirements, the actual backing down or closing down of such hydro units shall be subject to limitations on such account & to avoid spillage of water.

8. Section 8

And Dispatch

8.

1. Introduction. - This section sets out the demarcation of responsibilities between various State utilities and SLDC in Scheduling & Dispatch.

8.2Objective. - The objective of this section is to deal with the procedures to be adopted for scheduling of ISGS, SSGS, IPPs, Joint Ventures, CPPs, Open Access Customers and REGs in detail and responsibility of SLDC in preparing & issuing daily schedule of dispatch/drawal of generator and Discoms. It also provides methodology of issuing real time dispatch/drawal instructions and rescheduling if required to SSGS & Discoms along with the commercial arrangement from deviation from the schedules.8.3General Principles of Scheduling:8.3.1All the Scheduling will be done on 15 minutes time block. For this purpose of scheduling each day starting from 00.00 hrs to 24.00 hrs is divided into 96 time blocks each of 15 minutes duration. SLDC compile and intimate each DISCOMs the Drawal Schedule and to each SSGS and IPPs the Generation Schedule in advance.8.3.2The State Load Dispatch Centre is responsible for coordinating the scheduling of a generating station, within the control area, real-time monitoring of the station's operation, 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, or in any other way revision of availability declaration and injection schedule, switching instructions, meter data processing, collections/disbursement of DSM payments, outage planning, etc.8.3.3The control area jurisdiction of generating stations under SLDC shall be as per clause no 6.4(2),6.4(3) and 6.4(4) of IEGC.8.3.4The SSGS and IPPs 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 generating stations shall also declare the possible rapping up/rapping down in a block.8.3.5The declaration of the generating capability by hydro SSGS and IPPs should include limitation on generation during specific time periods, if any, on account of restriction(s) on water use due to irrigation, drinking water, industrial, environmental considerations etc. The State Load Dispatch Centre shall periodically check that the generating station, is not manipulating the declaration of the capacity and energy with the intent of making undue money through DSM.8.3.6The SSGS and IPPs shall be required to demonstrate the declared capability of its generating station as and when asked by the State Load Dispatch Centre. In the event of the SSGS and IPPs failing to demonstrate the declared capability, the capacity charges due

to the generator shall be reduced as a measure of penalty.8.3.7The 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.8.3.8Discoms or M P Power Management Company Limited on behalf of Discoms (on receipt of requisition from Discoms) will give their requisitions on day ahead and real time basis as per individual Merit Order i.e. in ascending order of the cost of energy (i.e. variable cost) of generating stations excluding hydro, nuclear and REGs.8.3.9The net drawl schedule of any DISCOM issued by SLDC would be sum of ex-power plant schedules from different SSGS/IPP and joint sector project, share from ISGS and any bilateral exchange agreed by the DISCOMs with any other agency inside/outside the region and drawal/injection on behalf of Open Access Customers.8.3.10The generation schedule of each SSGS shall be sum of the requisitions made by each DISCOM, restricted to their entitlement and. subjected to maximum and minimum value criteria or any other technical constraints indicated by SLDC.8.3.11All the Infra State entities shall endeavour to maintain their Drawals/injections in such a manner that they do not violate the limits on deviation volume as specified in the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, .2014 and subsequent amendments thereof.8.3.12Generation Schedules and Drawal Schedules issued/revised by SLDC shall become effective from designated time block irrespective of communication success.8.3.13For any revision of Scheduled Generation of GENCO, including post facto deemed revision; there shall be a corresponding revision of Scheduled Drawals of the DISCOMs.8.3.14A procedure for recording the communication regarding changes to schedules duly taking into account the time factor shall be evolved by SLDC (voice recorder with time stamping).8.3.15Generator to ensure that Declared Capacity during peak should not be less than during off-peak period of the day.Exception: Tripping I re-synchronization of units due to forced outage.8.3.16The following specific points would be taken into consideration while preparing the schedules:(i)SLDC to check that the resulting power flows do not give rise to any transmission constraint. In case of any constraints SLDC has to moderate the schedule to the required extent, under intimation to concerned DISCOMs.(ii)SLDC to check that schedules are operationally reasonable particularly in terms of Rapping up/Rapping down rates and ratio between minimum and maximum generation levels. SLDC to moderate the schedule to the required extent under intimation to concerned DISCOMs. The rapping up/rapping down rates in respect of different categories of stations would be based on the technical data as substantiated by generating stations and as mutually agreed by DISCOMs.8.3.17Wind and Solar generators shall mandatorily provide to the SLDC, in a format as prescribed by SLDC, the technical specifications at the beginning and whenever there is any change. The data relating to power system parameters and weather related data as applicable shall also be mandatorily provided by such generators to SLDC in real time.8.3.18Forecasting shall be done by wind and solar generators as well as by the SLDC. The SLDC may engage forecasting agency and prepare a schedule for such generating stations. The forecast by the SLDC shall be with the objective of ensuring secure grid operation. The forecast by the wind and solar generator shall be generator centric. The wind and solar generators will have the option of accepting the SLDC's forecast for preparing its schedule or provide the SLDC with a schedule based on its own forecast. Any commercial impact on account of deviation from schedule based on the forecast chosen by the wind and solar generator shall be borne by it in terms of MPEIE1C (Forecasting, Scheduling, Deviation settlement Mechanism and related matters of wind

and Solar generating stations) Regulations, 2018 as amended from time to time..8.3.19For calculating the net Drawl Schedules of DISCOMs, the transmission losses shall be apportioned in proportion to their drawl schedules.8.4Scheduling Process:(i)By 10.00hrs everyday each SSGS/IPPs/REGs will intimate SLDC the station wise ex-power plant MW and MWH capabilities foreseen for the next day i.e. between 00.00hrs to 24.00hrs of the following day, at 15 minute intervals.(ii)By 10.00hrs WRLDC sends MW and MWH entitlement schedule in each 15 minutes block from ISGS stations/other Long term and medium term agreement to SLDC.(iii)On the basis of above information, SLDC will compile Generator-wise availability for ISGS, other Long term and medium term agreement, IPPs, REGs & SSGS and MW and MWH entitlement of each DISCOM during the following day at 15 minutes interval shall be intimated to MP Power Management Co. Ltd on behalf of DISCOMs by 12.00hrs.(iv)After receipt of information in regard to the availability from different SSGS, IPPs, REGs, other Long term and medium term agreement and ISGS, all DISCOMs, on the basis of their demand pattern, will furnish requisition through MP Power Management Co. Ltd in each ISGS, other Long term and medium term agreement, IPPs & SSGS stations to SLDC by 13.00hrs.(v)By 14.00hrs M P Power Management Company Limited shall intimate to State Load Dispatch Centre, the Discom wise ex-Power Plant Mega Watt requisition in each of the Generating Stations along with Long-term Bilateral transactions, Medium Term Transactions, approved Short term Bilateral transactions and collective transactions through power exchanges.(vi)By 15.00hrs SLDC will convey the MP requisition to WRLDC after that WRLDC will convey the schedule from ISGS, other Long term and medium term agreement, IPPs, REGs for each State by 17.00hrs.(vii)By 18.00hrs SLDC will finalize the generation schedule of SSGS and drawal schedule of DISCOMs.• SLDC will intimate the Generation Schedule to SSGS/IPPs i.e. ex-power plant dispatch schedule• SLDC will intimate Drawl Schedule to MP Power Management Co.Ltd./DISCOMs as follows:(a)The drawl schedule i.e. the schedule at MP Periphery after apportionment of POC Losses. (sum of schedule from SSGS, IPPs, REGs, other Long term and medium term and short term agreement and ISGS), for monitoring of drawal at real time demand in MW.(b)The above drawl schedule will also contain the net drawl schedule i.e. the schedule at the periphery of DISCOM after deducting the apportioned estimated POC and MP transmission losses (sum of schedule from SSGS, IPPs, REGs, other Long term and medium term and short term agreement and ISGS), for DSM computation on the basis of actual energy drawal as per ABT meters.(viii)The DISCOM/SSGS may inform the modifications to be made if any, in the above schedule to SLDC by 21.30 hrs.(ix)SLDC will inform all the modifications pertaining to ISGS or inter-State power transfer to WRLDC by 22.00 hrs.(x)After receipt of final drawal schedule of ISGS from WRLDC at 23.00 hrs and taking into account all the modifications indicated by DISCOMs, SLDC shall issue the final Generation/Drawal Schedule to each SSGS and MP Power Management Co. Ltd./DISCOMs by 23.30 hrs.(xi)The Discoms may also give standing instructions to the SLDC such that the SLDC itself may decide the best drawal schedules for the States.8.5SLDC shall prepare the day ahead generation schedule by keeping in view the following aspects -(a)Transmission system constraints from time to time.(b)Hourly load requirements as estimated by SLDC.(c)Need to provide operating margins and reserves required to be maintained.(d)Availability of generation from SSSG and ISGS together with any constraint in each case.8.6Rules for revision in schedule in real time operation:(i)In case of forced outage of a unit, SLDC will revise the schedules on the basis of revised declared capability by the generator. The revised schedule will become effective from 4th time block, counting the time block in which the revision is advised by the generator to be the first one.(ii)In the event of a situation arising due to

bottleneck in evacuation of power due to transmission constraint, SLDC shall revise the schedule which shall become effective from the time block, counting the time block in which the transmission constraint has been brought to the notice of SLDC as the first one. During the first three time blocks also the schedule shall deemed to have been revised to be equal to the actual generation by the SSGS and drawl by the DISCOMs.(iii)In case of any grid disturbance, the Scheduled Generation of all the generating stations and Scheduled Drawal of all the DISCOMs shall be deemed to have been revised to be equal to their actual generation/drawal for all the time blocks affected by grid disturbance. The exact duration of such grid disturbance would be declared by SLDC/RLDC on the basis of mutually agreed guidelines.(iv)Revision of Declared Capability by SSGS and requisitions by DISCOMs for the remaining period of the day will be permitted with advance notice. Revised schedules/Declared Capability in such cases shall become effective from the 4th time block, counting the time block in which the request for revision has been received in SLDC to be the first one.(v)To discourage frivolous revisions, SLDC may, at its sole discretion, refuse to accept schedule/capability changes of less than two (2) percent of previous schedule/capability. The schedule of thermal generating stations indicating fuel shortage while intimating the Declared Capacity to the SLDC shall not be revised except in case of forced outage of generating unit.(vi)If, at any point of time SLDC observes that there is a need for revision of its schedule in the interest of better system operation, it may do so on its own and in such cases, the revised schedule shall become effective from 4th time block, counting the time block in which the revised schedule is issued by SLDC to be the first one.(vii)If a revision is received from any ISGS stations, RLDC will flash the information in real time basis containing all the relevant information-needed to revise the schedule based on which SLDC will parallel process the revision. The implementation time of revision will be same for RLDC and SLDC.(viii)While availability declaration by SSGS/IPPs/REGs shall have a resolution of one decimal (0.1) MW and one decimal (0.1) 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, and shall have a resolution of 0.01 MW.(ix)The schedule by wind and spier generators may be revised by giving advance notice to the SLDC. Such revisions shall be effective from 4th time block, the first being the time-block in which notice was given. There may be one revision for each time slot of one and half hours starting from 00:00 hours of a particular day subject to maximum of 16 revisions during the day.8.7After the operating day is over at 24.00 hours, the Schedule finally implemented during the day (taking into account all before-the-fact changes in Dispatch Schedule of Electricity Generating Stations and Drawal Schedule of the other Intra- State Entities) shall be issued by State Load Dispatch Centre within three days or on receipt of Western Regional Load Dispatch Centre implemented schedule. Further, implemented schedule may be revised by State Load Dispatch Centre if Ex-post facto revision in implemented schedule is made by Western Regional Power Committee.. These Schedules shall form the basis for commercial accounting. The average Ex-bus capability for each State Area Generating Station and Independent Power Producers shall also be worked out based on all before the- fact advice to State Load Dispatch Centre.8.8Technical Minimum Schedule for operation of Thermal Generating Stations. - 1. The technical minimum for operation in respect of a unit or units of a State Sector Generating Station having 100% installed capacity tied up/contracted with M.P. Power Management Co. Ltd./Discoms of MP through long term PPA and whose tariff is determined by MPERC, shall be 55% of MCR loading or installed capacity of the unit/(s) of such generating station.

2. The generating stations like SSGS which are having 100% installed capacity tied up/contracted with M.P. Power Management Co. Ltd./Discoms of MP through long term PPA and whose tariff is determined by MPERC may be directed by SLDC to operate its unit(s) at or above the technical minimum but below the normative plant availability factor on account of grid security or due to the fewer schedules given by the beneficiaries.

3. Where the SSGS having 100% installed capacity tied up/contracted with M.P. Power Management Co. Ltd./Discoms of MP through long term PPA and whose tariff is determined by the MPERC, is directed by the SLDC to operate below normative plant availability factor but at or above technical minimum; the SSGS may be compensated depending on the average unit loading duly taking into account the forced outages, planned outages, PLF, generation at generator terminal, energy sent out ex-bus, number of start stop, secondary fuel oil consumption and auxiliary energy consumption, in due consideration of actual and normative operating parameters of station heat rate, auxiliary energy consumption and secondary fuel oil consumption etc. on monthly basis duly supported by relevant data verified by SLDC.

Provided that:(i)In case of above mentioned coal/lignite based generating stations, following station heat rate degradation or actual heat rate, whichever is lower, shall be considered for the purpose of compensation:

	Unit loading as a % of Installed Capacity of the Unit	Increase in SHR (for super-critical Units) (%)	Increase in SHR (for sub-critical Units) (%)
1	85-100	Nil	Nil
2	75-84.99	1.25	2.25
3	65-74.99	2.00	4.00
4	55-64.99	3.00	6.00

(ii)In case of above mentioned coal/lignite based generating stations, the following Auxiliary Energy Consumption degradation or actual, whichever is lower, shall be considered for the purpose of compensation:

SI. No	Unit Loading (% of MCR)	% Degradation in AEC admissible
1.	85-100	NIL
2.	75 - 84.99	0.35
3.	65 - 74.99	0.65
4.	55 - 64.99	1.00

(iii)Where the scheduled generation of SSGS falls below the technical minimum schedule, the concerned SSGS shall have the option to go for reserve shut down and in such cases, start-up fuel cost over and above seven (7) start/stop in a year shall be considered as additional compensation based on following norms or actual, whichever is lower.

Unit Size (MW)	Oil consumption per start up (KL)		
Hot	Warm	Cold	
200/210/250 MW	20	30	50
500 MW	30	50	90
660 MW	40	60	110

(iv)Compensation for the Station Heat Rate and Auxiliary Energy Consumption shall be worked out in terms of energy charges.(v)The compensation so computed shall be borne by the entity who has caused the plant to be operated at schedule lower than corresponding to Normative Plant Availability Factor up to technical minimum based on the compensation mechanism finalized by the SLDC which shall be guided by the mechanism finalized by WRPC for ISGS/CGS.(vi)No compensation for Heat Rate degradation and Auxiliary Energy Consumption shall be admissible if the actual Heat Rate and/or actual Auxiliary Energy Consumption are lower than the normative Station Heat Rate and/or normative Auxiliary Energy Consumption applicable to the unit or the generating station in a month or after annual reconciliation at the end of the year.(vii)There shall be reconciliation of the compensation at the end of the financial year in due consideration of actual weighted average operational parameters of station heat rate, auxiliary energy consumption and secondary oil consumption.(viii)The change in schedule of power under the provisions of MPERC (Ancillary Services Operations) Regulations whenever notified shall not be considered for compensation.

4. In case of generating stations other than SSGS, wherein the 100% installed capacity is not tied up with MPPMCL/Discoms of MP through a long term power purchase agreement or whose tariff for only partial/contracted capacity is determined by the Commission, such generating station/company may have to appropriately factor in the above provisions in the PPAs entered into by it with M.P. Power Management Company! Discoms for sale of power, in order to claim compensations for operating at the technical minimum schedule.

5. The generating company shall keep the record of the emission levels from the plant due to part load operation and submit a report for each year to the Commission by 31st May of the year.

6. SLDC shall prepare a Detailed Operating Procedure in consultation with the generators and beneficiaries at OCC forums within 3 months' time and submit to the Commission for approval. The Detailed Operating Procedure

shall contain the role of different agencies, data requirements, procedure for taking the units under reserve shut down and the methodology for identifying the generating stations or units thereof to be backed down up to the technical minimum in specific Grid conditions such as low system demand, Regulation of Power Supply and incidence of high renewable etc., based on merit order stacking.

The SLOG shall work out a mechanism for compensation for station heat rate and auxiliary energy consumption for low unit loading on monthly basis in terms of energy charges and compensation for secondary fuel oil consumption over and above the norm for additional start-ups in excess of 7 start-ups, in consultation with generators and beneficiaries at OCC forum and its sharing by the beneficiaries.While preparing the above Detailed Operating Procedure and working out the aforesaid mechanism, the SLDC may be guided by the Detailed Operating Procedure and mechanism approved by the Central Commission under Indian Electricity Grid Code.8.9Data Registration. - User shall provide SLDC with data for this section as specified in Data Registration Section.

9. Section 9

Frequency and Voltage Management9.1Introduction. - This section describes the method by which all Users of the State Transmission System shall co-operate with SLDC and STU in contributing towards effective control of the system frequency and managing the EHV voltage of the State Transmission System.State Transmission System normally operates in synchronism with the Western Region Grid and WRLDC has the overall responsibility of the integrated operation of the Western Regional Power System. The constituents of the Region are required to follow the instructions of WRLDC for the backing down generation, regulating loads, MVAr drawal etc. to meet the objective.SLDC shall accordingly instruct Generating Units to regulate Generation/Export and hold reserves of active and reactive power within their respective declared parameters. SLDC shall also regulate the load as may be necessary to meet the objective.State Transmission System voltage levels can be affected by Regional operation. The STU/SLDC shall optimize voltage management by adjusting transformer taps (On Line Tap Changers) to the extent available and switching of circuits/capacitors/reactors and other operational steps. SLDC will instruct SSGS to regulate MVAr generation within their declared parameters. SLDC shall also instruct Discoms to regulate demand, if necessary.9.2Objective. - The objectives of this section are as follows:• To define the responsibilities of all Users in contributing to frequency and voltage management.• To define the actions required to enable SLDC and STU to maintain State Transmission System voltages and frequency within acceptable levels in accordance with IEGC guidelines, and Planning and Security Standards for State Transmission System.9.3Frequency Management9.3.1The rated frequency of the system shall be 50 Hz and shall normally be regulated within the limits prescribed in IEGC Clause 4.6(b) as also specified in Connection Conditions. STU & SLDC as constituent of Western Region shall make all possible efforts to ensure that grid frequency remain within 49.90 - 50.05 Hz band.9.3.2Falling frequency. - Under falling frequency conditions, SLDC shall take appropriate action to issue instructions, in co-ordination with WRLDC to arrest the falling frequency and restore

it to be within permissible range. Such instructions may include dispatch instruction to the generators under control area of SLDC and/or instruction to Discoms and Open access users to reduce load demand by appropriate manual and/or automatic load shedding.9.3.3Rising Frequency. - Under rising frequency conditions, SLDC shall take appropriate action to issue instructions to the generators under control area of SLDC in co-ordination with WRLDC, to arrest the rising frequency and restore frequency within permissible range. SLDC shall also issue instructions to Discoms and Open access users in coordination with WRLDC to lift Load shedding (if exists) in order to take additional load.9.4Responsibilities9.4.1SLDC shall monitor actual Drawal against scheduled Drawal and regulate internal generation/demand to maintain this schedule. SLDC shall also monitor reactive power drawal and availability of capacitor banks.9.4.2Generating Stations under control area of SLDC shall follow the dispatch instructions issued by SLDC.9.4.3Discoms and Open access users shall co-operate with SLDC in managing load & reactive power drawal on instruction from SLDC as required.9.5Voltage Management9.5.1Users using the State Transmission System shall make all possible efforts to ensure that the grid voltage always remains within the limits specified in IEGC at clause 5.2s and produced below:

Voltage(kVrms)

Nominal	Maximum	Minimum
765	800	728
400	420	380
220	245	198
132	145	122
33	36	30

9.5.2STU and/or SLDC shall carry out load flow studies based on operational data from time to time to predict where voltage problems may be encountered and to identify appropriate measures to ensure that voltages remain within the defined limits. On the basis of these studies, SLDC shall instruct the generators within its control area to maintain specified voltage level at interconnecting points. SLDC and STU shall co-ordinate with the Discoms to determine voltage level at the interconnection points.SLDC shall continuously monitor 400/220/132kV voltage levels at strategic substations.9.5.3SLDC shall take appropriate measures to control State Transmission System voltages, which may include but not be limited to transformer tap changing, capacitor/reactor switching including capacitor switching by Discoms at 33kV substations, operation of Hydro unit as synchronous condenser and use of MVAr reserves with the generators within its control area within technical limits agreed to between STU and Generators. Generators shall inform SLDC of their reactive reserve capability promptly on request.9.5.4SSGS and IPPs shall make available to SLDC the up to date capability curves for all Generating Units, as detailed in Section 5, indicating any restrictions, to allow accurate system studies and effective operation of the State Transmission System. CPPs shall similarly furnish the net reactive capability that will be available for Export to/Import from State Transmission System.9.5.5Discoms and Open access users shall participate in voltage management by providing Local VAR compensation (as far as possible in low voltage system close to load points) such that they do not depend upon EHV grid for reactive support.9.6Reactive Power management9.6.1Reactive power compensation should ideally be provided locally, by generating reactive power as close to the reactive power consumption as possible. The State Entities

except Generating Stations are therefore expected to provide local Volt Ampere reactive (VAr) compensation/generation such that they do not draw VArs from the EHV grid, particularly under low-voltage condition. To discourage VAr drawals by Discoms except Generating Stations, VAr exchanges with State Grid shall be priced as follows:(a)The Discoms pay for VAr drawal when voltage at the metering point is below 97%.(b)The Discoms get paid for VAr return when voltage is below 97%.(c)The Discoms get paid for VAr drawal when voltage is above103%.(d)The Discoms pay for VAr return when voltage is above 103%.The charge for VArh shall be as per IEGC Regulations, 2010, as amended from time to time.9.6.2Notwithstanding the above, SLDC may direct a State Entities except Generating Stations to curtail its VAr drawal/injection in case the security of grid or safety of any equipment is endangered.9.6.3In general, the State Entities except Generating Stations shall endeavour to minimize the VAr drawal at an interchange point when the voltage at that point is below 95% of rated voltage, and shall not return VAr when the voltage is above 105%. Transformer taps at the respective drawal points may be changed to control the VAr interchange as per State Entities except Generating Station's request to the SLDC, but only at reasonable intervals.9.6.4Switching in/out of 400 kV bus and line Reactors throughout the grid shall be carried out as per instructions of RLDC/SLDC. Tap changing on all identified 400/220, 220/132 kV & 220/66 kV Transformers shall be done as per SLDCs instructions only.9.6.5The SSGS and other generating stations connected to state grid 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.9.7General. - Close co-ordination between Users and SLDC and STU shall exist at all times for the purposes of effective frequency and voltage management.

10. Section 10

Monitoring of Generation and Drawal10.1Introduction. - The monitoring by SLDC of SSGS, IPPs and REGs output and active and reactive reserve capacity is important to evaluate the performance of generation plants.The monitoring of scheduled Drawal is important to ensure that STU, Other transmission licensees and Discoms contribute towards improving system performance, and observe Grid discipline.10.2Objective. - The objective of this section is to define the responsibilities of all SSGS, IPPs' and REGs in the monitoring of Generating Unit reliability and performance, and STU's/Discoms' compliance with the scheduled Drawal to assist SLDC in managing voltage and frequency.10.3Monitoring Procedure10.3.1For effective operation of the State Transmission System, it is important that a SSGS declared availability is realistic and that any departures are continually invariably fed back to the Generator to help effect improvement.10.3.2SLDC shall continuously monitor Generating Unit outputs and Bus voltages. More stringent monitoring may be performed at any time when there is reason to believe that a SSGS and IPPs declared availability may not match the actual availability or declared output does not match the actual output.10.3.3SLDC can ask for putting a generating station to demonstrate the declared availability by instructing the generating station to come up to the declared availability within time specified by generators.10.3.4SLDC shall inform a SSGS and IPPs, in writing, if the continual monitoring demonstrates an apparent persistent or material mismatch between the dispatch instructions and the Generating Unit output or breach of the Connection Conditions. Continued discrepancies shall be resolved by the Grid Code Review Committee with a view to either improve performance in future, providing more realistic

declarations or initiate appropriate actions for any breach of Connectivity Conditions.10.3.5SSGS (excluding CPPs), IPPs and Renewable Energy Generators (REGs) shall provide to SLDC hourly generation summation outputs whenever telemetry data is not available through SCADA/RTU equipment. Clops shall provide to SLDC hourly export/import MW and MVAr.10.3.6The SSGS, IPPs and REGs shall provide any other logged readings that SLDC may reasonably require, for monitoring and reporting purposes.10.4Generating Unit Tippings10.4.1SSGS (excluding CPPs) and IPPs shall promptly inform the tripping of a Generating Unit, with reasons, to SLDC in accordance with the operational Event/Accident Reporting section. 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.10.4.2The operating log books/log records of the generating station and EHV sub stations shall be available for review by the SLDC. These books/records shall keep record of machine operation, outage/tripping of Transmission elements and maintenance.10.5Monitoring of Drawal10.5.1SLDC shall continuously monitor actual MW Drawal by Discoms against that scheduled by use of SCADA equipment. STU shall request WRLDC and adjacent States as appropriate to provide any additional data required to enable this monitoring to be carried out.10.5.2SLDC shall continuously monitor the actual MVAr Drawal to the extent possible. This will be used to assist in State Transmission System voltage management.10.6Data Requirement. - SSGS, IPPs and REGs shall submit data to SLDC as listed in Data Registration section, termed as Monitoring of Generation.

11. Section 11

Outage Planning11.1Introduction. - (a) This section describes the process by which STU carries out the planning of State Transmission System Outages, including interface co-ordination with Users.(b)The generation output and transmission system should be adequate after taking into account the outages to achieve the security standard.(c)Annual outage plan shall be prepared in advance for the financial year by the SLDC in consultation with STU and Discoms and reviewed during the year on Bi-Monthly basis. All, Users, STU etc shall follow these annual outage plans. 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.11.2Objective. - The objective of this section is to define the process, which will allow STU to optimise transmission Outages with SSGS (other than CPP), IPPs and Discoms' Outages while maintaining system security to the extent possible.11.3Outage Planning Process. - Each User shall provide their operational planning data including outage programme as per APPENDIX 'C' for ensuing financial year to the SLDC for preparing an overall outage plan for State Transmission System as a whole. SLDC shall be responsible for analyzing the outage schedules of the SSGS, IPPs, Discoms and STU schedule for outage of Transmission network and preparing a draft annual outage Plan for State Transmission System in coordination with the Outage Plan prepared for the region by the WRPC.However, SLDC is authorised to defer the planned outage in case of any of the following events:(a)Major grid disturbance(b)System Isolation(c)Black out in the State(d)Any other event in the system that may have an adverse impact on system security by the proposed outageEach User shall obtain approval

of SLDC, prior to availing the Outage. SLDC while releasing any circuit for outage shall issue specific code. Similarly, no inter user boundary circuits shall be connected back to the State Transmission System without specific code/approval by SLDC. This restriction shall however not be applicable to individual Generating Unit(s) of a CPP.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 outage11.4Annual Outage Planning11.4.1Scheduled outage of power stations will be subject to annual planning.11.4.2Provided that scheduled outage of power station and EHV lines as notified by WRPC, will also be subject to annual planning by WRPC in co-ordination with SLDC.11.4.3SSGS and !PP connected to State Grid shall furnish their proposed Outage programme for the next financial year in writing by 15th November of each year.11.4.4SSGS and IPPs Outage programme shall contain details like identification of unit, reason for outage, generation availability affected due to such outage, outage start date and duration of outage. SLDC will review the outage programme received from SSGS and IPPs on bimonthly basis in OCCM to chalk out the outage of state transmission system.11.4.5SLDC shall also obtain from STU, the proposed outage programme for transmission lines, equipments and sub-stations etc. for next financial year by 15th November each year. STU outage programs shall contain identification of lines/substations, reason for outage, outage start date and duration of outage.11.4.6Scheduled outage of 400 KV transmission elements and 220 KV/132 KV interstate lines shall be affected only with the approval of WRPC in coordination with SLDC. Scheduled outage of power stations and other transmission elements shall be approved by the SLDC, 24 hours in advance based on prevalent operating conditions.11.4.7The above annual outage plan shall be reviewed by SLDC on Bi-monthly basis in OCCM of MP in coordination with all parties concerned, and adjustments made wherever found to be necessary.11.4.8Load Generation Balance Report (LGBR) and the annual outage plan for the following financial year should be finalised by 31st December of each year. The RPC Secretariat shall be primarily responsible for finalization of the Annual Load by 31st December of each year. All SSGS, Discoms, IPPs, transmission licensee and other generating stations shall provide information to SLDC.and SLDC shall submit LGBR for its control area to the WRPC Secretariat in writing for the next financial year by 31st October of each year. These shall contain identification of each generating unit/transmission line/ICT etc., the preferred date for each outage and its duration and where there is flexibility, the earliest start date and latest finishing date. The annual plans for managing deficits/surpluses in respective control areas shall clearly be indicated in the LGBR submitted by SLDCs.11.5Availing of shutdowns schedule11.5.1SLDC would review on daily basis the outage schedule for the next two days and in case of any contingency or conditions described in section 6.7.4(g) of the !EGG, defer any planned outage as deemed fit clearly stating the reasons thereof. The revised dates in such cases would be finalized in consultation with the User.11.5.2Each User and STU shall obtain the final approval from SLDC prior to availing an outage.

12. Section 12

Contingency Planning12.1Introduction. - This section describes the steps in the recovery process to be followed by all Users in the event of State Transmission System or Regional System total or partial blackouts.12.2Objective. - The objective of this section is to define the responsibilities of all Users to achieve the fastest recovery in the event of a State Transmission System or Regional System

blackout, taking into account essential loads, Generator capabilities and system constraints.12.3Contingency Planning Procedure12.3.1SLDC shall be prepared to face and efficiently handle the following two types of contingencies:(a)Partial system black out in the state due to multiple tripping of the transmission lines emanating from power stations/sub-station(b)Total black out in the state/region12.3.2In case of partial black out in the system/state, priority is to be given for early restoration of power station units, which are tripped. Start up power for the power station shall be extended through shortest possible line and within shortest possible time from adjoining sub-station/power station where the supply is available. Synchronising facility at all power stations and 400/220kV sub-station shall be available.12.3.3In case of total regional black out, SLDC In-charge shall co-ordinate and follow the instructions of WRLDC for early restoration of the entire grid. After total collapse, for each power station, to avoid damage to the turbine, survival power is required. To meet the survival power, the diesel generating (DG) sets of sufficient capacity shall be available at each power station. Start-up power to the thermal station shall be given by the hydel stations and interstate supply, if available. All possible efforts shall be made to extend the hydel supply to the thermal power stations through shortest transmission network so as to avoid high voltage problem due to low load condition. For safe and fast restoration of supply, STU shall formulate the proper sequence of operation for major generating units, lines, transformers and load within the state in consultations with WRPC. The sequence of operation, shall include closing/tripping of circuit breakers, isolators, on-load tap-changers etc. In emergency situations the licensee may approach to a near by captive power plant to get the start up power. The STU shall formulate the proper sequence of operations in this regard.12.3.4List of generating stations with black start facility, inter-State/inter- regional ties, synchronizing points and essential loads to be restored on priority, shall be prepared and be available with NLDC, RLDC and SLDC.12.4Restoration Procedure12.4.1The procedure for restoration of State Transmission System shall be prepared by the SLDC for the following contingency and shall be in conformity to the System Restoration Procedure of the Western Region prescribed under IEGC.(a)Total system black out(b)Partial System Blackout(c)Synchronisation of System Islands and System Split12.4.2The restoration process shall take into accounts the generator capabilities and the operational constraints of Regional and State Transmission System with the object of achieving normalcy in the shortest possible time. All Users must be aware of the steps to be taken during major Grid Disturbance and system restoration process.12.4.3The 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 SLDC at least once every six months under intimation to the WRLDC. Diesel Generator sets for black start would be tested on weekly basis and test report shall be sent to WRLDC on quarterly basis under intimation to SLDC.12.5Special Considerations12.5.1During restoration process following State Transmission System or Regional system blackout conditions, normal standards of voltage and frequency shall not apply.12.5.2Distribution Companies with essential loads will separately identify non-essential components of such loads, which may be kept off during system contingencies. Distribution Companies shall draw up an appropriate schedule with corresponding load blocks in each case. The non-essential loads can be put on only when system normally is restored, as advised by SLDC.12.5.3All Users shall pay special attention in carrying out the procedures so that secondary collapse due to undue haste or inappropriate loading is avoided.12.5.4Despite the urgency of the situation, careful prompt and complete logging of all operations and operational messages shall be

ensured by all Users to facilitate subsequent investigation into the incident and the efficiency of the restoration process. Such investigation shall be conducted promptly after the incident.12.5.5All communication channels required for restoration process shall be used for operational communication only, till grid normalcy is restored.

13. Section 13

Inter User Boundary Safety13.1Introduction. - This section sets down the requirements for maintaining safe working practices associated with inter user boundary operations. It lays down the procedure to be followed when work is required to be carried out on electrical equipment that is connected to another User's system.13.2Objective. - The objective of this section is to achieve agreement and consistency on the principles of safety as prescribed in the Indian Electricity Rules when working across a inter user boundary between one User and another User.13.3Designated Officers. - STU and all Users shall nominate suitably authorized persons to be responsible for the co-ordination of safety across that company boundary. These persons shall be referred to as Designated Officer.13.4Procedure13.4.1STU shall issue a list of Designated Officers (names, designations and telephone numbers) to all Users who have a direct inter user boundary with STU. This list shall be updated promptly whenever there is change of name, designation or telephone number.13.4.2All Users with a direct inter user boundary with STU or other user system shall issue a similar list of their Designated Officer to STU or other user, which shall be updated promptly whenever there is a change to the Designated Officer list.13.4.3Whenever work across an inter-user boundary between STU and any other User or between two users is to be carried out, the Designated Officer, of the User (which may be STU), wishing to carry out work shall personally contact the other relevant Designated Officer. If the Permit to Work (PTW) cannot be obtained personally, the designated officers shall contact through telephone and exchange Code words to ensure correct identification of both parties.13.4.4Should the work extend over more than one shift the Designated Officer shall ensure that the relief Designated Officer is fully briefed on the nature of the work and the code words in operation.13.4.5The Designated Officers 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.13.4.6Work shall not commence until the Designated Officer, of the User (who may be STU), wishing to carry out the work, is satisfied that all the safety precautions have been established. This Designated Officer shall issue agreed safety documentation (P-1W) to the working party to allow work to commence. The PTVV in respect of specified EHV lines and other interconnections shall be issued with the consent of SLDC.13.4.7When work is completed and safety precautions are no longer required, the Designated Officer who has been responsible for the work being carried out shall make direct contact with the other Designated Officer.to return the PTW and removal of those safety precautions. Return of PTW in respect of specified EHV lines and interconnections shall be informed to SLDC.13.4.8The 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 Designated Officers, and return of agreed safety documentation from the working party has taken place.13.4.9STU shall develop an agreed written procedure for inter user boundary safety and continually update it.13.4.10Any dispute concerning Inter user Boundary Safety shall be resolved at an appropriate higher level of

authority.13.5Special Consideration13.5.1For inter user boundary between STU and other Users circuits, all Users shall comply with the agreed safety rules, which must be in accordance with IE Rules.13.5.2All equipment on inter user boundary between STU and other Users 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.13.5.3Each Designated Officer shall maintain a legibly written safety log, in chronological order, of all operations and messages relating to safety co-ordination sent and received by them. All safety logs shall be retained for a period of not less than 5 years.

14. Section 14

Reports14.1Periodic reports:14.1.1Monthly Report. - A monthly report shall be issued by SLDC to Users of STS and shall cover the performance of the State grid for the previous month. The monthly report shall contain the following:-(a)Frequency profile:Maximum and minimum frequency recorded 'daily and daily frequency variation index (FVI).(b)Voltage profileThe Voltage profile of selected substations.(c)Major Generation and Transmission Outages.(d)Transmission Constraints.(e)Instances of persistent/significant non-compliance of Grid Code.14.1.2Other Reports/Forms. - The SLDC shall also issue a quarterly report to users of STS 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.14.1.3These reports shall also be submitted to the Commission within a week from the due date of issue of the reports.14.2Operational Event/accident Reporting14.2.1introduction. - This section describes the reporting procedure, in writing of reportable events in the State Transmission System14.2.2Objective. - The objective of this section is to define the incidents to be reported, the reporting route to be followed and the information to be supplied to ensure a consistent approach to the reporting of incidents and accidents on the State Transmission System.14.2.3Reportable incidents. - Any of the following events that could affect the State Transmission System requires reporting:(a)Exceptionally high/low system voltage or frequency.(b)Serious equipment problem i.e. major circuit breaker, transformer or bus-bar.(c)Loss of Generating Unit.(d)System split, State Transmission System break away or Black Start.(e)Tripping of Transmission Line, ICT (Interconnecting transformer) and capacitor banks(f)Major fire incidents.(g)Major failure of protection.(h)Equipment and transmission line overload.(i)Accidents-Fatal and Non-Fatal.(j)Load Crash/Loss of Load(k)Violation of Security Standards(l)Grid Indiscipline(m)Non-Compliance of SLDC instructions(n)Excessive Drawal deviations(o)Minor Equipment alarms.The last two reportable incidents are typical examples of those which are of lesser consequence, but which still affect the State Transmission System and can be reasonably classed as minor. They will require corrective action but may not warrant management reporting until these are repeated for sufficient time.14.2.4Reporting Procedure/Forms14.2.4.1Reporting Time for events and accidents. - a. All reportable incidents occurring in lines and equipment of 132kV and above affecting the State Transmission System shall promptly be communicated by the User whose equipment has experienced the incident (The Reporting User) to any other significantly affected Users and to SLDC.b. Within 1(one) hour of being

informed by the Reporting User, SLDC may ask for a written report on any incident as per Appendix -H.c. If the reporting incident can not 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 24 hours of the submission of the initial written report.d. In other cases the Reporting User shall submit a report within 5(five) working days to SLDC.14.2.4.2SLDC may call for a report from any User on any reportable incident affecting other Users and STU, in case the same is not reported by such User whose equipment might have been source of the reportable incident. This shall not relieve any User from the obligation to report events in-accordance with IE Rules.The format of such a report will be as agreed by the Grid Code Review Committee, but will typically contain the following information:(a)Location of incident.(b)Date and time of incident.(c)Plant or equipment involved.(d)Details of relay indications with nature of fault implications.(e)Supplies interrupted and duration if applicable.(f)Amount of generation lost if applicable.(g)Brief description of incident.(h)Estimate of time to return to service.(i)Name of originator.(j)Possibility of alternate arrangement of supply(k)Single line diagram(l)All Relevant system data including copies of records of all recording instruments including Disturbance Recorder, Event Logger, DAS etc14.2.5Major Failure. - Following a major failure, SLDC and other Users shall co-operate to inquire and establish the cause of such failure and produce appropriate recommendations. The SLDC shall report the major failure to Commission immediately for information and shall submit the enquiry report to the Commission within 2(two) months of the incident14.2.6Accident Reporting. - Reporting of accidents shall be in accordance with the relevant Rules/Regulations. In both fatal and non-fatal accidents, the report shall be sent to the Electrical Inspector in the prescribed form.

Part IV

Protection Code

15. Section 15

Protection15.1Introduction15.1.1In order to safeguard State Transmission System, Users' system from faults it is essential that certain minimum standards for protection be adopted. This section describes these minimum standards.15.1.2If any of the provision not covered under protection code of MPEGC, the same as specified under Central Electricity Authority (Grid Standards) Regulation, 2010 shall be applicable. If any of the provisions of the existing Protection Code of Madhya Pradesh Electricity Grid Code is inconsistent with any of the provisions of CEA (Grid Standards) Regulations, 2010, the provisions of Regulations made by CEA shall prevail.15.2Objective. - The objective of this section is to define the minimum protection requirements for any equipment connected to the State Transmission System and thereby minimize disruption due to faults.15.3General Principles15.3.1Protection standards are treated as interface issues because of the possible severe inter- user boundary repercussions of faults that occur in the system of any entity. Minimum protection requirements are prescribed in this section because inadequate protection or mal-operation of protection system of any entity may result in far reaching consequences, disturbances and even damages in the systems of other entities.15.3.2No item of electrical equipment shall be allowed to remain connected to the State Transmission System unless it is

covered by minimum specified protection aimed at reliability, selectivity, speed and sensitivity.15.3.3All Users shall co-operate to ensure correct and appropriate settings of protection to achieve effective, discriminatory removal of faulty equipment within the time for target clearance specified in this section.15.3.4Protection 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.15.3.5For the following, STU will also be guided by the advise of WRLDC:(i)Planning for upgrading and strengthening protection system based on analysis of grid disturbance and partial/total blackout in State Transmission System.(ii)Planning of Is-landing and system split schemes and installation of Under Frequency Relays and df/dt relays.(iii)Under-Frequency relay for load shedding, Relays provided for is-landing scheme, disturbance recorder and fault locater installed at various substations shall be tested and calibrated. The Protection Practices and Protocol Manual shall have provision for the same.15.4Protection Co-ordination. - A Protection Coordination Committee (PCC) shall be constituted as per Section 3 of the Grid Code and shall be responsible for all the protection coordination functions defined under the same section. STU shall be responsible for arranging periodical meetings of the Protection Coordination Committee. STU shall investigate any malfunction 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 the periodical meetings15.5Fault Clearance Times & Short-time Ratings. - From a stability consideration, the minimum short circuit current rating and time and the maximum fault clearance times for faults on any User's system directly connected to the State Transmission System, or any faults on the State Transmission System itself, are as follows:

Nominal Voltage	Minimum Short Circuit current rating	Target Fault clearance Time	
kV	kA (rms)	Seconds	msec.
765kV			100
400kV	40	1	100
220kV	31/40	1	160
132kV	25/31	3	160

Slower fault clearance times for faults on a users system is not allowed from system security point of view. STU shall specify the required opening time and rupturing capacity of the circuit breakers at various locations for STU and Discoms/Open access users directly connected to Transmission System. At generating stations, line faults should be cleared at the generation station end, within the critical clearing time, for the generators to remain in synchronism.15.6Generator Requirements15.6.1The guidelines mentioned in the "Manual on protection of Generators, Generator Transformers, and 220 kV and 400 kV networks" vide publication no 274 of CBIP shall be kept in view.15.6.2All Generating Units and all associated electrical equipment of the Generating Units connected to the State Transmission System shall be protected by adequate protection so that the State Transmission System does not suffer due to any disturbances originating from the Generation unit. The generator protection schemes shall cover at least Differential protection, back up protection, Stator Earth fault protection, field ground/field failure protection (not applicable to

brush-less excitation system), negative sequence protection, under frequency, over flux protection, backup impedance protection and pole slipping protection (applicable to units above 200MW), loss of field protection, reverse power protection etc.15.7Transmission Line Requirements15.7.1General. - Every EHV line taking off from a Power Station or a sub-station shall have protection and back up protection as mentioned below. STU shall notify Users of any changes in its policy on protection from time to time.For short transmission lines, alternative appropriate protection schemes may be adopted. Relay Panels for the protection of lines of STU taking off from a Power Station, shall be owned and maintained by Generator. Any transmission line related relay settings or any change in relay settings will be carried out by the Generator in close co-ordination and consultation and with STU approval. All such issues shall be put up in the next Protection Coordination Committee for ratification. Carrier cabinets/equipment, Line matching units including wave traps and communication cable shall be owned and maintained by STU. All Generators shall provide space, Connection facility, and access to STU for such purpose.15.7.2400kV Transmission Lines. - All 400kV transmission lines owned by STU shall have two fast acting protection schemes, the voltage of the two relays shall be fed from two different cores of the line CVT and the currents of the two relays shall be fed from two different cores of the line CTs.Main 1. - protection scheme shall be numerical, three zone, non-switched fast acting distance protection scheme with permissible inter-trip at remote end (in case of zone-2 fault)Main 2. - protection scheme shall be either similar type of numerical, three zone, non-switched fast acting distance protection scheme with permissible inter-trip at remote end (in case of zone-2 fault) OR a unit protection scheme employing transient wave detection, directional comparison or phase comparison carrier relaying scheme.One pole tripping and single shot auto-re-closing with adjustable dead-time shall be provided.15.7.3400kV Bus-bars. - All 400KV Substations for 400KV of bus shall have numerical bus bar differential protection scheme along-with LBB and auto re-closures for transmission lines.15.7.4220kV Transmission Lines. - AU 220kV transmission lines owned by STU shall have single, numerical, three zone, non-switched fast acting distance protection scheme, preferably with permissible inter-trip feature at remote end (in case of zone-2 fault), single pole tripping and single-shot single pole auto-re-closing with adjustable dead-time shall be provided. For back-up protection, three directional IDMTL over current relays and one directional earth fault relay shall be provided. For short transmission lines, appropriate alternative protection schemes may be adopted.15.7.5220kV Bus-bars. - All 220KV Sub station for 220KV Bus shall have numerical bus bar protection scheme. Also on lines connected with Generation in feed, PGCIL, single pole carrier tripping and single shot single pole auto re-closing shall be provided.15.7.6132kV Lines. - A single three zone switched/non switched numerical distance protection scheme shall be provided as main protection. The backup protection shall be directional/non-directional IDMTL 2 over current + 1 E/F relay. For feeders connected with power stations the backup protection shall be directional IDMTL 20/C+1E/F relay15.8Transformer Requirements15.8.1The protection of Auto Transformers, Power Transformers and Distribution Transformers shall be as per revised manual on transformers published by Central Board of Irrigation and Power (CBIP) Publication No. 275.15.8.2All windings of Auto Transformers and power transformer of EHT class shall be protected by differential relays having percent bias and harmonic restraint features.15.8.3Over-fluxing relays shall be provided for EHT transformers.15.8.4All 400kV class transformers shall have Restricted Earth Fault (REF) protection for winding.15.8.5In addition, there shall be back up IDMTL over current and earth fault protection.15.8.6For parallel operation, such back up protection shall have directional feature. For

protection against heavy short circuits, the over current relays should incorporate a high set instantaneous element, wherever overall co-ordination permits the same. However, it should not grip due to inrush of the magnetising current and should not be set to such a high value, which is not beneficial to transformer.15.8.7In addition to electrical protection, gas operated relays, winding temperature protection and oil temperature protection shall be provided.15.8.8It is recommended that the following minimum protections should be provided for transformers:(a)All 400kV class power transformers shall be provided with differential, REF, open delta (Neutral Displacement Relay) and over-fluxing relays. In addition, there shall be back up IDMTL over current and earth fault protection. For parallel operation, such back up protection shall have inter-tripping of both HT and LT breakers. For protection against heavy short circuits, the over current relays should incorporate a high set instantaneous element. In addition to electrical protection, transformer own protection viz. buchholz, OLTC oil surge, gas operated relays, winding temperature protection, oil temperature protection, PRV relay shall be provided for alarm and trip functions. It is recommended to have Double PRV protection scheme for transformer tank.(b)All 220kV class power transformers shall have same protections as mentioned in Sections 15.8.8 (a) except REF protection.(c)For 132kV and 33kV class transformers of capacity 5 MVA and above, the protections shall be same as mentioned in Sections 15.8.8 (a) above except over- fluxing relays, REF and PRV.(d)For 33kV class power transformers of less then 5 MVA capacity provided on either Transmission or Distribution System, over-current with high set instantaneous element along with auxiliary relays for transformer trip and alarm functions as per transformer requirements, shall be provided.15.9Sub-Station Fire Protection. - Adequate precautions shall be taken and protection shall be provided against fire hazards to all Apparatus of the Users conforming to relevant Indian Standard Specification and/or provisions in I.E. Rules.15.10Calibration & Testing. - The protection scheme shall be tested at each 400kV, 220kV, 132kV, 66kV sub- station by STU once in a year or immediately after any major fault, which ever is earlier. Setting, co- ordination, testing and calibration of all protection schemes pertaining to generating units/stations shall be responsibility of MPPGCL. The overall co-ordination between MPPGCL and STU shall be decided in meeting of Protection Co-ordination Committee. The Protection Co-ordination Committee shall review the testing and calibration as and when needed.15.11Data Requirements. - Users shall provide STU with data for this section as specified in APPENDIX 'D' of Data Registration section.

Part V

Transmission Metering Code

16. Section 16

Transmission Metering16.1Introduction16.1.1The code prescribes a uniform policy in respect of electricity metering for State Transmission Utility (STU), Generating Companies, inter-utility metering and any metering for all Users of Transmission System including open access customers as per the Electricity Act 2003 using transmission system of State Transmission Utility and any new system interfacing with State Transmission Utility system in the state of Madhya Pradesh.16.1.2This code shall form a part of the Madhya Pradesh Electricity Grid Code (MPEGC) prepared under section 86 (1) (h) of the Electricity Act 2003.16.2Objective16.2.1The objective of the code is to define

minimum acceptable metering standards which will affect proper metering of the system parameters for the purpose of accounting, commercial billing and settlement of electrical energy and will also provide information which will help to optimize the system planning.16.3Scope16.3.1The scope of the code covers the practices that shall be employed and the facilities that shall be provided for the measurement and recording of various parameters like active/reactive/apparent power/energy, power factor, voltage, frequency etc.16.3.2The code sets out or refers to the requirements of metering at generating stations, sub-stations and interfaces for Tariff and Operational metering.16.3.3The code also specifies the requirement for calibration, testing and commissioning of metering equipments viz. energy meters with associated accessories, current transformers and voltage transformers. The code broadly indicates the technical features of various elements of the metering, data communication, testing and calibration system, the procedure for assessment of consumption in case of defective and stuck-up meters and also lays down guidelines for resolution of disputes between different agencies.16.3.4The date of commencement of this code shall be date of publication in Madhya Pradesh Gazette and accordingly the concerned licensees, generators and open access consumers shall commence its implementation.16.4Reference Standards16.4.1The following Indian Standards (amended up to date) shall be applicable as relevant to meters and associated equipment

Sr.	Standard Number	Standard Title
1.	IS 13779	AC Static Watt-hour Meters for Class 1 & 2
2.	IS 14697	AC Static Transformer Operated Watt-hour andVAr-hour Meters, Class 0.2S and 0.5S
3.	IS 2705	Indian Standard for Current Transformers
4.	IS 3156	Indian Standard for Voltage Transformers
5.	IS 9348	Indian Standard for Coupling Capacitors andCapacitor Divider
6.	IS 5547	Indian Standard for Capacitor VoltageTransformer
7.	CBIP Technical Report - 88	Specification for AC Static Electrical EnergyMeters
8.	CBIP Technical Report - 111	Specification for Common Meter ReadingInstrument
9.	IS 9000	Basic Environmental Testing Procedures forElectronic & Electrical items
10.	IS 12063	Indian Standard for classification of degrees ofprotection.

16.4.2The following International Standards (amended up to date) can be applicable as relevant to meters and associated equipment not complying to Indian Standards or not manufactured in India:

Sr.	Standard Number	Standard Title
i.	IEC 687	Specification for AC Static Watt-hour Meters forActive Energy (Classes 0.2S and 0.5S)
ii.	IEC 1036	Alternating Current Static Watt-hour Meters forActive Energy Classes 1& _2)
iii	IEC 1268	Alternating Current Static Watt-hour Meters forReactive Energy (Classes 2 &

3)

16.5Definitions. - Apart from the definitions covered in this Code or the Act or any other Regulation of the Commission the following definitions are also covered in this clause:16.5.1Active Energy. - Active Energy means the electrical energy produced, flowing or supplied by an electrical circuit during a time interval and being the integral of the instantaneous power with respect to time, measured in units of watt hours or standard multiples thereof, which is:

1.

,000 Wh =1 kWh = 1 Unit

1.

,000 kWh = 1 MWh

1.

,000 MWh = 1 GWh = 1 MU (Million Units)16.5.2Active Power. - Active Power means the product of voltage and the in-phase component of alternating current measured in units of watts and standard multiples thereof, which is:

1.

,000 W = 1 kW

1.

,000 kW =1 MW

1.

,000 MW = 1 GW16.5.3Apparent Energy. - Apparent Energy means the integral of the Apparent Power with respect to time. It is measured in Volt Ampere hour and standard multiple thereof, which is:

1.

,000 VAh = 1 kVAh

1.

,000 kVAh = 1 MVAh

1.

,000 MVAh = 1 GVAh16.5.4Apparent Power. - Apparent Power means the product of voltage and current measured in units of volt amperes and standard multiples thereof, which is:

1.

,000 VA = 1 kVA

1.

,000 kVA = 1 MVA

1.

,000 MVA = 1 GVA16.5.5Data Processing System (DPS). - Data Processing System means a Computer System meant for receiving data manually or downloaded through CMRI or retrieved through remote communication network, converts downloaded raw data into standard output format (e.g. ASCII, csv) and processes data for various calculations, analysis and display,16.5.6Centralized Data Collection Centre (CDCC). - The centre which is responsible to collect, collate and process the energy meter data for various applications like energy accounting and auditing, energy billing, transmission system loss calculations and power purchase bill reconciliation.16.5.7Common Meter Reading Instrument (CMRI or MRI). - CMRI means a common meter reading instrument with necessary accessories capable of downloading data/information from various makes of AC static energy meters when loaded with the corresponding meter specific downloading software(s) called meter reading instrument program(s).The CMRI can extract information about energy data, load survey data, billing parameters, meter status, meter anomaly and tamper data from the memory of the meter and store for retrieval at a later stage.16.5.8Demand Integration Period. - Demand Integration Period means the period over which active power, reactive power or apparent power are integrated to produce energy value for averaging. For settlement purpose, each Demand Integration Period shall be of 15 minutes duration, which shall commence from 00.00 hours. Demand computation shall be on sliding window principle with three updates.16.5.9Demand Values. - (a) Demand value in terms of energy: Energy demand means active energy, reactive energy or apparent energy drawn during any demand period, one of which shall commence from 00.00 hours.(b)Demand value in terms of power: Power demand means active power, reactive power or apparent power drawn during any demand period, one of which shall commence from 00.00 hours.16.5.10Instrument Transformers. - Current Transformer (CT) or Voltage Transformer (VT). The term VT is used to cover either Electromagnetic Voltage Transformer (EVT) or Capacitive Voltage Transformer (CVT). EVT is also known as Potential Transformer (PT).16.5.11Load Survey Data. - Load survey data is a database of load values defined in terms of Watt, VAr or VA (or multiples of thereof) during each predefined interval of time.16.5.12Meter. - Meter means a device for measurement of bidirectional active energy, reactive energy, apparent energy, active power, reactive power, apparent power, currents, voltages, power

factor, frequency and any other electrical parameter derived out of these measurements.16.5.13Main Meter and Check Meter. - The primary meter used for billing purpose is named as Main Meter. The check meter is used as back-up to main meter for billing purpose, in case main meter fails or operates erroneously or shows error beyond permissible limits.16.5.14Metering Equipment. - Metering equipment means set of energy meters, associated instrument transformers and cabling, local networking equipment for meters and associated wiring.16.5.15Metering Point. - Actual metering point means the physical location of current and voltage sensing devices (i.e. CTs, VTs) and meters at which electricity is metered.16.5.16Operational Metering. - Metering equipment and associated accessories (excluding any tariff metering) installed in the sub-station or generating station primarily for:(a)Operational and System Control purposes(b)Monitoring and Manual Recording purposes(c)Auditing and accounting of energy16.5.17Overall Accuracy. - The combined accuracy of meter, associated instrument transformers and cabling for a given metering system.16.5.18Protocol. - Protocol is the software implemented to exchange the information with external device or equipment through interfacing communication port.16.5.19Reactive Power. - Reactive Power means the product of voltage and current and the sine of the phase angle between them measured in units of volt amperes reactive and standard multiples thereof, that is:

1.

,000 VAr = 1 kVAr

1.

,000 kVAr = 1 MVAr

1.

,000 MVAr = 1 GVAr16.5.20Reactive Energy. - Reactive Energy means the integral of the Reactive Power with respect to time. It is measured in volt amperes reactive hours and standard multiple thereof, that is:

1.

,000 VArh = 1 kVArh

1.

,000 kVArh = 1 MVArh

1.

,000 MVArh = 1 GVArh16.5.21 (a)Simultaneous Maximum Demand (SMD). - For a given demand period, sum of individual demand across all interface points in a Distribution System gives

simultaneous demand of a Distribution Licensee for a given period. SMD means the maximum demand value out of all such simultaneous demands for a month (i.e. maximum demand value out of 4 x 24 x 30 = 2880 periods in a month for demand interval of 15 minutes).(b)Maximum demand means the 4 times maximum value of Average KVA delivered to consumers at the point of supply during any consecutive period of 15 minutes during the month computed on sliding window principal of a measurement.16.5.22Tariff Metering or Commercial Metering. - The energy measurement system comprising of metering equipments and associated data collection devices, based on which the energy supplying entity raises bills payable by the energy receiving entity or consumer.16.5.23TOD Tariff or TOU Tariff. - TOD stands for Time Of Day and TOU stands for Time Of Use, which means different tariff during different usage time in a day.16.6Ownership16.6.1The ownership of the metering system shall belong to the agency in whose premises the metering equipment is physically located.16.7Right to Install Energy Meters16.7.1The Owner of the metering system (as defined in Clause 16.6) shall provide necessary metering equipment. As and when required by the user, the owner shall enable the representatives of the user with advance notice, to access, inspect, test etc. any of the metering equipment installed in the Owner's premises.16.8Facility to be Provided on Metering Locations16.8.1The Owners shall make available the required space and the required outputs of the specified current and voltage transformers to facilitate installation of Meters and associated equipment in their premises and shall carry out operation and maintenance of these equipments. Necessary auxiliary supply shall be extended up to the metering system, if meter can be powered by only external supply.16.9Minimum Technical Requirements for Energy Meter16.9.1Measuring Elements. - The meter shall be 3 phase 4 wire, full four quadrant type static Tri-vector Meter (TVM), which can be used for 3 phase 3 wire system or 2 phase 2 wire system (traction application) without affecting the metering accuracy and other essential parameters. Meter shall basically measure fundamental rms value of electricity and harmonics.16.9.2Operating System Parameters (for balanced and unbalanced load). - (a) Operating Voltage Range: The meter shall work satisfactorily on 110 Volts AC (Line-Line) or 415 Volts AC (Line-Line) with variation range of -30% to +15%.(b)Operating Frequency Range: The meter shall work satisfactorily on 50 Hertz with variation range of -5% to +5%.(c)Operating Power Factor Range: The meter shall work satisfactorily over a power factor range of zero lag to unity to zero lead.16.9.3Rated Nominal Current and Rated Maximum Current. - Meter shall operate on 1 Ampere or 5 Ampere from CT secondary circuit. Rated maximum secondary current shall not exceed 120% of nominal current.16.9.4Rated Short time Current. - Meter shall be capable of withstanding 20 times the rated nominal current for 0.5 second.16.9.5Minimum Starting Current. - The meter shall start operating and recording energy with minimum starting current equal to 0.1% of nominal current at unity power factor.16.9.6Burden and Power Consumption. - The burden imposed by the metering system shall not exceed 1 W, 8 VA for voltage circuit and 1 VA for current circuit so that there is no significant voltage drop in the VT and CT leads.16.9.7Meters shall meet the following requirements of Accuracy Class-Interface meters 0.2S-Consumer meters Up to 650 volts 1.0S or better-Above 650 volts and up to 33 kilo volts 0.5S or better-Above 33 kilo volts 0.2S or betterEnergy Accounting and Audit meters - (1) In generating stations, the accuracy class of meters at a point after the generator stator terminals and before the tap off to the unit auxiliary transformer(s) shall not be inferior to that of 0.2S accuracy class. However, the accuracy class of other meters shall not be inferior to that of 1.0S accuracy class.(2)The accuracy class of meters in transmission system shall not be inferior to that of 0.2S accuracy class.(3)The accuracy class of

meters in distribution system.shall not be inferior to that of 0.5S accuracy class.The accuracy class of Current transformers (CTs) and Voltage transformers (VTs) shall not be inferior to that of associated meters. The existing CTs and VTs not complying with these regulations shall be replaced by new CTs and VTs, if found defective, non-functional. In case the CTs and VTs of the same Accuracy Class as that of meters can not be accommodated in the metering cubicle or panel due to space constraints, the CTs and VTs of the next lower Accuracy Class can be installed.16.9.8Earthing System. - The metering system shall be suitable for solidly earthed power system.16.9.9Meter Box. - The meter box shall confirm to the degree of protection not less than IP-51 as stipulated in IS 12063, and shall be capable of satisfactory operation in an indoor, non-air conditioned installation.16.9.10Installation and Mounting. - The meter shall be suitable for installation of indoor or outdoor application. The meter can be mounted in dust proof, lockable and tamper proof panel or rack or metal box, as per requirement and site condition, conforming to minimum IP-31.The metering system shall have facility of CT shorting when the meter module is withdrawn or dismantled.16.9.11Data Display Capabilities - Instantaneous Values. - The meter shall be capable to record and display (on demand) at least following instantaneous parameters/information:(a)Three rms line voltages(b)Three rms line currents(c)System frequency (Hz)(d)Power factor with sign of lag/lead.(e)Watt - Import(f)Watt - Export(g)VAr - Lead(h)VAr - Lag(i)VA - Import(j)VA Export(k)Maximum Demand (Import) during the month in Watt and VA with date and time(l)Maximum Demand (Export) during the month in Watt and VA with date and time(m)Meter Serial Number16.9.12Data Storage Capabilities - Cumulative Values. - The meter shall be capable to record, store and display (on demand) at least following cumulative parameters. At least five (5) registers shall be provided for each parameter, out of which one (1) register shall record energy for 24 hours in a day whereas other four (4) registers shall record Time of Day (TOD) energy during morning peak, morning off-peak, evening peak and evening off-peak durations:(a)Watt hour - Import(b)Watt hour - Export(c)VAr hour - Lead while Watt hour - Import(d)VAr hour - Lag while Watt hour - Import(e)VAr hour - Lead while Watt hour - Export(f)VAr hour - Lag while Watt hour - Export(g)VA hour - Import(h)VA hour - Export(i)VAr hour during low voltage (V<97%)*(j)VAr hour during high voltage (V>103%)**These parameters are for Availability Based Tariff (ABT) purpose only hence TOD registers are not required16.9.13[Data Logging Capabilities] [In case of operational metering, the number of parameters and their logging intervals shall be decided by the Licensee as per their operational requirements.] - Integrated Values. - The meter shall have sufficient memory to store any combination of at least ten (10) parameters listed in Clause 16.9.11 and Clause 16.9.12 over minimum forty (40) days at a logging interval of fifteen (15) minutes. The State Transmission Utility shall be able to select these parameters locally through optical port using CMRI and/or remotely through communication port. At least, following essential parameters shall be logged at an interval of 15 minutes:(a)Watt - Import(b)Watt - Export(c)VAr - Lead while Watt - Import(d)VAr - Lag while Watt - Import(e)VAr - Lead while Watt - Export(f)VAr - Lag while Watt - Export(g)VAr hour during low voltage (V<97%)(h)VAr hour during high voltage (V>103%)(i)Average frequency (Hz)(j)Average three phase voltage16.9.14[Other Parameters] [This clause may not be applicable for operational metering]. - Each meter shall also store the values of active energy (Import), active energy (Export), reactive energy (lag) and reactive energy (lead) separately during active energy (import) & active energy (export) conditions recorded at 24.00hours on last day of the month for a period of at least twelve (12) months. User shall be able to program time and day at which value of energy to be stored in the memory.16.9.15[Events and Abnormalities Logging Capabilities] [In case

of advanced metering, the meter need to store time stamped events with at least 1ms resolution for meeting operational needs.]. - The meter shall be able to log date and time stamped events captured with a resolution of at least one (1) second. Sufficient memory shalt be provided to store at least last 100 events in the meter on First-In-First-Out (FIFO) basis as following, but not limited to:(a)Missing potential (VT supply missing)(b)CTNT Polarity reversal(c)Current unbalances (magnitude as well as phase unbalance) in any one of the phases or more than one phase(d)Voltage unbalances (magnitude as well as phase unbalance) in any one of the phases or more than one phase(e)Supply interruptions along with the duration of each interruption(f)Tamper information/anomaly occurrence/anomaly restoration.(g)Meter internal set-up/program change information16.9.16Real Time Clock (RTC) and Calendar. - The meter shall have in-built Quartz crystal based accurate Real Time Clock. The meter shall display real time in 24 hours format (hh : mm : ss).Meter shall also display the date as per Indian calendar in dd-mm-yyyy format. Thirty (30) years calendar with automatic leap year adjustment shall be provided in the meter. The accuracy of the clock and calendar shall be better than one minute per year.16.9.17Time Synchronization. - All meters shall have facility for time synchronisation locally and/or remotely through a Global Positioning System (GPS) or through the central computer (at CDCC) using the same port used for remote data communication.16.9.18Data Retention. - The logged data shall be stored in a non-volatile memory of meter with a minimum retention period of ten (10) years without any battery back-up.16.9.19Data Concentration and Network Integration. - The local network of all meters installed in a sub-station shall be formed using modem/multiplexer/data concentrator/LAN hub switch. This local network shall be integrated with communication network using appropriate standard protocol. Communication network may be based on Radio frequency, Microwave, Public Switched Telephone Network (PSTN), Power Line Carrier Communication (PLCC), Vary Small Aperture Terminal (VSAT) network, Optical Fibre Cable (OFC), GSM, Radio or any other means of telemetry.16.9.20Pulse Output. - High intensity Light Emitting Diodes (LED) shall be provided on front of the meter for test calibration and accuracy check of Wh and VArh measurements.16.9.21Display. - Meter shall have a minimum of 7 digits Alpha-numeric Liquid Crystal Display (LCD) or Light Emitting Diode (LED) type display with bright back-light and automatic backlight time out feature. A touch key pad or push buttons shall be provided on the meter front for switching ON the display and for changing from one indication to next. Two separate push buttons shall be provided one for scrolling and other for MD resetting.16.9.22Data Security. - (a) Data encryption (coding) capability(b)Mechanical seals and locks i.e. sealing provision for terminal block, meter cover, MD reset button and all communication ports.(c)Message authentication algorithm capability/Multi-level password protection(d)Independent security across communication channels16.9.23Self Diagnostics Feature. - The meter shall have self diagnostics feature to scan the healthiness of internal components and circuitry. On detection of any exception or fault, meter shall display the message immediately.16.9.24Communication Ports. - The meter shall have at least following communication ports:(a)One optically isolated infra-red communication port (optical port) for local communication as per IEC 1107(b)One galvanically isolated Ethernet (LAN) port or RS485 serial port or RS232 serial port for remote communication16.9.25Communication Protocol. - For communication by meter with external devices, meter supplier shall implement industry standard open protocol(s) like MODBUS RTU, MODBUS, TCP/IP, IEC 870- 5-102, IEEE 1377, DNP 3.0, Device Language Message Specification (DLMS) or any other industry standard protocol.In case of proprietary protocol, the meter supplier

shall furnish the protocol software and details of protocol followed by him. Any variation in the standard protocol for optimizing communication resources shall be detailed.16.9.26Reprogramming of the meter. - Utility shall be able to select the display parameters, logging parameters, timings of TOD registers, billing dates, logging interval or any. other parameter locally using CMRI through optical and/or remotely using meter reprogramming software installed at CDCC through communication port(s).16.9.27Data Downloading. - Utility shall be able to download the logged data locally using CMRI through optical port and/or remotely using meter interrogation software installed at CDCC through communication port(s). Any interrogation/read operation shall not delete or alter any stored meter data.16.9.28Ratio and Phase Angle Correction Feature. - The meter shall have facility to correct the ratio error and phase angle error of external CTs and VTs connected to it.16.9.29External Auxiliary Supply. - (a) The meters shall be capable of powered up with 240V AC auxiliary supply and 110V or 220V DC supply of sub-station so that metering cores of VT is never loaded. The meter will normally be powered up by AC auxiliary supply and will be switched over automatically to DC supply only when AC auxiliary supply fails.(b)If any external supply is not available, self-powered type meter can be provided which derives internal power consumption from VT signal itself. In case of failure of main power supply or VT supply, meters shall be capable of being read locally using CMRI and/or remotely through communication network. Suitable maintenance-free dry battery shall be provided internally for this purpose.16.9.30The Interface meters shall be of open protocol confirming to IS 15959 and of point 0.2S accuracy class. The accuracy class of Current transformers (CTs) and voltage transformers (VTs) shall not be inferior to that of associated meters. The meters shall have a non-volatile memory in which following shall be automatically stored:-(a)Average frequency for each successive 15 minutes block, as a two digit code (00 to 99 for frequency from 49.0 to 51.0 Hz)(b)Net Wh transmitted during each successive 15 minutes block, up to second decimal, with plus/minus sign.(c)Cumulative Wh transmittal at each midnight, in six digits including one decimal.(d)Cumulative VArh transmittal for voltage high condition, at each midnight, in six digits including one decimal.(e)Cumulative VArh transmittal for voltage low condition, at each midnight, in six digits including one decimal.(f)Date and time blocks of failure of VT supply on any phase, as a star (*) mark.(g)The interface meters shall have the provision of recording of energy in 15 minutes time block as well as in 5 minutes time block as configured through software. In addition to the existing provisions of interface meters, the meters shall also have a provision of frequency resolution of 0.01Hz and they must be capable of recording Voltage and Reactive Energy at every 5-min and have feature of auto-time synchronization through GPS.16.10Minimum Technical Requirement for Current Transformer (CT)16.10.1Single-phase type current transformers shall be used for 3 phase 4 wire and 3 phase 3 wire and 2 phase 2 wire measurement system. The secondary current rating of the CTs shall be 1 ampere or 5 ampere depending upon the total circuit burden. 5A secondary can be used for low burden circuits.16.10.2Either dedicated set of current transformers or dedicated core of current transformers shall be provided for metering and wherever feasible, CTs (or their cores) feeding to main meters and check meters shall- be separate. The errors of the current transformers shall be checked in the laboratory or at site. However, if such facilities are not available, CT test certificates issued by Government test house or Government recognized test agency shall be referred to.16.10.3The total burden connected to each current transformer shall not exceed the rated burden of CT. Total circuit burden shall be kept close to rated burden of CT for minimum error.16.10.4Refer ANNEXURE-A and ANNEXURE-E for minimum acceptable detailed specification for current

transformer.16.11Minimum Technical Requirement for Voltage Transformers (VT)16.11.1Either Electromagnetic Voltage Transformers (EVT) or Capacitive Voltage transformer (CVT) may be used for metering purpose. Generally, term VT is used to cover either EVT or CVT. The secondary voltage per phase shall be 110/43 volts or 415/43 volts. The Ws shall be connected to main and check meters and shall preferably be dedicated to the metering. Fuses of proper rating shall be provided at appropriate locations in the VT circuit.16.11.2The errors of the VTs shall be checked in the lab or at site. However if such facilities are not available, VT test certificates issued by Government test house or Government recognized test agency shall be referred to.16.11.3The total burden connected to each VT shall not exceed the rated burden of VT. % voltage drop in VT leads shall be within the permissible limits.16.11.4Refer Annexure-B, Annexure-C, Annexure-D And Annexure-E for minimum acceptable detailed specification for voltage transformer.16.12Application of Metering System16.12.1Generating Stations. - Main and check meters shall be installed on all outgoing feeders and stand by meters at HV side of Generator transformer and HV side of all station auxiliary transformer at Generating Stations to work out energy generated and net energy delivered by the power station in the grid. Commercial settlement shall be based on the energy meters installed at interface points as defined in the electricity grid code or applicable agreement.16.12.2Non-conventional Energy Sources. - The location of meters installed at interface points of Renewable Energy Generator plants shall be as under :

Metering Arrangement	Location of Renewable Energy Meter
Feed in tariff metering : Renewable Energy Plantis connected to the grid to inject the entire electricitygenerated to the grid.	Out going feeder from Renewable Energy Plant. Incase of RE generators where pooling of generation is at commonpooling station, meters shall be installed at outgoing feeders ofpooling stations.
Net Metering:- Renewable Energy Plant isconnected to the load bus of the owner to consume electricitygenerated primarily by the owner of the plant and excesselectricity, if any, is injected to the grid.	In case of first installation for the purpose ofRenewable Energy Metering, the ';Renewable Energy Meter' shall beinstalled at the location specified for consumer meter and incase of existing consumers, the consumer meter shall be replacedwith' Renewable Energy Meter.'

16.12.3Metering between State Transmission Utility -Distribution Licensee.(a)For measurement of power delivered by State Transmission Utility to Distribution Licensee, Main metering shall be provided on the LV side of EHV Power Transformer i.e. 33kV side of 220/33 KV, 132/33kV and 11kV side of 132/11kV transformers installed in EHV sub-stations. The standby metering shall be provided on the HV side of EHV Power Transformer i.e. 220/33 KV, 132/33kV and 132/11kV transformers installed in EHV sub-stations. Operational meters shall also be provided on all outgoing 33kV and 11kV feeders for energy audit on feeder and reconciliation of energy with respect to energy measured on LV side of EHV Power Transformer.(b)In case of EHV industrial consumers of Distribution Licensee directly fed from 220kV or 132 kV sub-station of State Transmission Utility, tariff metering shall be provided on outgoing feeder emanating from EHV sub-station of State Transmission Utility. In case of railway traction main and check meter shall be provided on traction sub station (TSS) and standby meter shall be at STU substation.16.12.4Metering between two Distribution Licensees. - The energy metering shall be provided at such points of the power lines connecting any two Distribution Systems owned by different Distribution Licensees so that the

measured energy gives correct measurement of consumption by either Distribution Licensee.If installation of metering at tapped points is not feasible, it shall be provided at both the ends of feeder to which tapped feeder is connected.16.12.5Sub-station Auxiliary Consumption Metering. - The State Transmission Utility sub-stations auxiliary consumption shall be recorded on LV side of station auxiliary transformers. If such transformer(s) is feeding other local load (colony quarters, street lights etc.) apart from sub-station auxiliary load, separate metering shall be provided on individual feeders.Except unidirectional kWh, other data logging/billing capabilities/energy registers/other features may not be required for this application:16.12.6Open Access Customer. - In case of Generator availing/seeking open access, the metering equipments shall be installed on outgoing feeders emanating from the generating station.In case of CPP having parallel operation permission and connected through dedicated feeder with grid but not the consumer of Discom and availing/seeking open access to sell power, the metering equipment shall be installed in Transmission Licensee's premises. If the CPP is connected through tapped feeder, the metering equipment shall be Installed at CPP end.In case of EHV/HV consumer having contract demand/standby support with Discoms and availing/seeking open access metering equipment shall be installed in the premises of OAC.In case of EHV/HV consumer with CPP having contract demand/standby support with Discoms and availing/seeking open access metering equipment shall be installed in the premises of OACIn case of any Distribution Licensee availing/seeking open access, metering equipment shall be installed at each supply point interfacing with transmission network.16.12.7Operational Metering. - Operational metering shall be sited wherever reasonably required by State Transmission Utility/Generating Companies for applications other than tariff metering. The parameters and other requirements shall be finalized by State Transmission Utility based on the operational requirements.16.13Data Collection Systems and Data Downloading16.13.1All concerned Intra-State Entities (in whose premises the Special Energy Meters are installed) shall provide Automatic Meter Reading (AMR) facility for transmitting ABT meter data to SLDC remotely. If the weekly data of Special Energy Meter is not received through AMR system installed at SLDC, the same may be downloaded and transmitted to the SLDC by the owner of the ABT meter or entities who have been authorized to take energy meter reading.16.14Testing Arrangements16.14.1The test terminal blocks shall be provided on all meters to facilitate testing of meters. Portable test set with high accuracy static source and 5 times more accurate (or better) electronic reference standard meter shall be used for testing. This means at least class 0.05S reference standard meter for testing of class 0.2S meter, class 0.1S reference standard meter for testing of class 0.5S meter and class 0.2S reference meters for testing of class 1.0S meter. These benches shall also be used for checking and calibration of portable testing equipments. The above shall be applicable for laboratory testing of meters, however, for site testing meter testing equipments with one class higher accuracy than meter under test may be used as per provision of IS-12346-1999.16.14.2Separate test terminal blocks for testing of main and check meters shalt be provided so that when one meter is under testing, the other meter continues to record actual energy during testing period. Where only one/main meter exists, an additional meter shall be put in circuit during the testing period of the main meter so that while the main meter is under testing, the other meter can record energy during the period of meter under testing.16.15System for Joint Inspection, Testing, Calibration16.15.1The metering system located at metering points between Generating Companies, State Transmission Utility and Distribution Licensees shall be regularly inspected, tested and calibrated jointly by both the agencies involved for dispatch and receipt of energy at least

once in a 5 year or whenever the energy and other quantity recorded by the meter are abnormal or inconsistent with electrically adjacent meters or as mutually agreed. Since the static trisectors meters are calibrated through software at the manufacturers' works, only accuracy of the meters and functioning shall be verified during joint inspection and certified jointly by both the agencies. In case of any doubt or defect, the meter shall be replaced then and there or calibrated. In later case, error correction as determined will be applied to the meter reading for the purpose of billing contingency referred as in Clause 16.19 and comprising their readings. To cover for loss of time, spare meters shall always be kept available with the agency to whom the meter/metering point belongs. After testing, the meter shall be properly sealed and a joint report shall be prepared giving details of testing work carried out, details of old seals removed and new seals affixed, test results, further action to be taken (if any) etc. The agency in whose premises the meter is located shall be responsible for proper security, protection of the metering equipment and sealing arrangement.16.15.2Joint inspection shall also be carried out as and when difference in meter readings (so corrected) exceeds the sum of maximum error as per accuracy class of main and check meter. The meters shall be jointly tested/calibrated on all loads and power factors as per relevant standards through static phantom load.16.16Meter Sealing Provision16.16.1Tariff metering systems shall be jointly sealed by the authorized representatives of the concerned parties as per the procedure agreed upon.16.16.2No seal, applied pursuant to this metering code, shall be broken or removed except in the presence of or with the prior consent of the agency affixing the seal or on whose behalf the seal has been affixed unless it is necessary to do so in circumstances where(i)both main and check meters are malfunctioning or there occurs a fire or similar hazard and such removal is essential and such consent can not be obtained immediately(ii)such action is required for the purpose of attending to the meter failure. In such circumstances, verbal consent shall be given immediately and it must be confirmed in writing forthwith.16.16.3Each party shall control the issue of its own seals and sealing pliers, and shall keep proper register/record of all such pliers and the authorized persons to whom these are issued.16.16.4Sealing of the metering system shall be carried out in such a manner so as not to hamper downloading of the data from the meter using CMRI or a remote meter reading system.16.17Access to Equipment and Data16.17.1Each constituent of the agency (Utility) on request with advance notice, shall grant full right to install metering equipments for other agency's employees, agents/duly authorized representative for inspecting, testing, calibrating, sealing, replacing the damaged equipment, collecting the data, joint reading recording, and other functions necessary and as mutually agreed.16.18Operation and Maintenance of the Metering System16.18.1The maintenance of the meters shall be the exclusive responsibility of the owner of the meters. The ownership of meters has been defined in Clause 16.616.18.2The operation and maintenance of the metering system includes proper installation, regular maintenance of the metering system, checking of errors of the CTs, VTs and meters, proper laying of cables and protection thereof, cleaning of connections/joints, checking of voltage drop in the CTNT leads, condition of meter box and enclosure, condition of seals, regular/daily reading meters and regular data retrieved through CMRI and DPS, attending any breakdown/fault on the metering system etc.16.19Procedure for Assessment of Consumption in case of Defective and/or stuck up Meter16.19.1Whenever a meter goes defective, the consumption recorded by the check meter shall be referred for a period agreed mutually. The details of the malfunctioning along with date, time and snap-shot parameters along with load survey shall be retrieved from the main meter. The exact nature of the mal-functioning shall be brought out after analyzing the data so retrieved and the

consumption/losses recorded by the main meter shall be assessed accordingly.16.19.2If main as well as check metering systems become defective, the assessment of energy consumption for the outage period shall be done by the concerned parties as mutually agreed or at the level of Transmission Metering Committee (vide Clause 16.21)or as per Balancing and Settlement Code, 2015.16.20Replacement of Defective or Stuck-up Meter16.20.1Defective or stuck-up meter shall be replaced as soon as possible. The owner of the meter shall maintain spare inventory of meters in sufficient quantity, so that down time is minimized.16.21Transmission Metering Committee (TMC)16.21.1State Transmission Utility shall be responsible for managing and serving the Transmission Metering Code among the constituents for discharging its obligation under the License.16.21.2The Grid Code Review Committee shall establish a Transmission Metering Committee (TMC) in accordance with Grid Code and such Committee shall consist of the following:(a)A Chairman, who is an Officer designated by State Transmission Utility(b)A Member (Secretary), who is also an Officer from State Transmission Utility(C)One representative from the State Generating Company(d)One representative from each of the Distribution Licensees(e)One member from Power Grid Corporation of India (PGCIL) representing WRLDC(f)One Member from IPPs (functioning) and major CPPs (with installed capacity exceeding 50 MW) connected to the State Transmission Utility's transmission system16.21.3The rules to be followed by the Committee in conducting their business shall be formulated by the Committee themselves and shall be approved by Grid Code Review Committee. The Committee shall meet at least once in six (6) months and conduct the following functions:(a)To keep Metering Code and its working under scrutiny and review.(b)To consider all requests for amendment to the Metering Code which any user makes.(c)To publish recommendations for changes to the Metering Code together with the reason for the change and any objection if applicable.(d)To issue guidance on the interpretation and implementation of the Metering Code.16.22Mechanism for Dispute Resolution16.22.1Any disputes relating to inter-utility metering between State Transmission Utility and any Generating Company/Distribution Licensees/Users shall be settled in accordance with procedures given under relevant Power Purchase Agreements (PPA)/Connection Agreement or relevant Agreement, as the case may be. In case of unresolved dispute, the matter may be referred to the Commission.16.23Implementation of Transmission Metering Code16.23.1For existing metering system not complying with this Code, State Transmission Utility shall submit a time-bound action plan to MPERC for replacement of the metering equipment in phased manner keeping in view the emerging and future requirements like development of open power market, Electricity Act 2003 Requirements, ABT implementation in state, other tariff structures (two-part tariff etc.), Quality of Supply monitoring, remote monitoring/control etc.16.23.2For any new procurement of metering system, this code shall be applicable immediately.16.24Dynamic Code16.24.1To have a dynamic code is very valuable aspect because there is continuous and very fast up-gradation in the technology of metering and communication, therefore the code needs to be reviewed periodically as decided by the Commission.16.25If any of the provisions of the prevailing Metering Code of Madhya Pradesh Electricity Grid Code is inconsistent with any of the provisions of Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 and its amendments issued by the CEA in this regard, the provisions of Regulations made by CEA shall prevail.Annexure-AMinimum Acceptable Specifications Of DedicatedSingle-Phase EHV & HV Current Transformers (Ct) For Metering

Sr.	Particulars				
11kV	33kV	132kV	220kV		
1	Nominal System Voltage (kVrms)		33	132	220
2	Highest System Voltage (kVrms)		36	145	245
3	Reference Standard	1S2705 with latest amendments			
4	Standard CT Ratio		1200/1-1 800-400/1-1 600-300/1-1 400-200/1-1 300-150/1-1 100-50/1-1	800-400/1-1 400-200/1-1 200-100/1-1 100-50/1-1	1200-600/1-1 800-400/1-1
5	No. of Metering cores	Two			
6	Rated Continuous Thermal Current	125% of Rated Primary Current			
7	Rated Short time thermal primary current		26.2KA for 2 sec	40KA for 1 sec	40KA for 1 sec
8	CT characteristics:				
(a)	Rated Primary Current(Amps)		800 600 400 300 200 150 100 50	800 400 200 100 50	1200 800
(b)	Rated Secondary Current (Amps)		1	1	1
(c)	Accuracy Class	0.2S	0.2S	0.2S	0.2S
(d)	Maximum Instrument Security Factor(ISF)		5	5	5
(e)	Rated Secondary Burden (VA)		30	10	10
9	Reference Standard for insulating oil	1S335 with latest amendments			

Annexure-BMinimum Acceptable Specifications Of DedicatedSingle-Phase Ehv Capacitor Voltage Transformers (CVT) For Metering

Sr. No.	Particulars	132kV	220kV
1	Nominal System Voltage (kV rms)	132	220
2	Highest System Voltage (kV rms)	145	245
3	Reference Standard	IS 3156 with latest amendments	
4	Rated Capacitance (pF)	4400 pF with tolerance +10% and -5%	
5	For low voltage terminal over entire carrierfrequency		
	(a) Stray Capacitance	Shall not exceed 200 PF	
	(b) Stray Conductance	Shall not exceed 20 micro siemens	
6	(a) High frequency capacitance for entirecarrier frequency range	Within 80% to 150% of rated capacitance	
	(b) Equivalent Series Resistance over the entirefrequency range	Less than 40 ohms	
7	No. of Secondary Windings for potentialmeasurement devices	Two	
8	Standard Voltage Ratio		
	(a) Winding-1	132kV/□3/110V/□3	220kV/□3/110V/□3
	(b) Winding-II	132kV/□3/110V/□3	220kV/□3/110V/□3
9	Rated Secondary Burden (VA)		
	(a) Winding-I	50	50
	(b) Winding-II	50	50
10	Accuracy Class		
	(a) Winding-I	0.2/0.2S	
	(b) Winding-11	0.2/0.2S	
11	Rated Voltage Factor and Duration		
	(a) Winding-1	1.2 continuous and 1.5 for 30 seconds	
	(b) Winding-II	1.2 continuous and 1.5 for 30 seconds	
12	Reference Standard for insulating oil	IS 335 with latest amendments	

Note. - Electromagnetic VTs may be used upto 220KV class.Annexure-CMinimum Acceptable Specifications Of DedicatedSingle-Phase Ehv Potential Transformers (Pt) For Metering

Sr. No.	Particulars

132kV	220KV		
1	Nominal System Voltage(kVrms)	132	220
2	Highest System Voltage(kVrms)	145	245
3	Reference Standard	IS 3156 with latest amendments	
4	No. of Secondary Windings for potentialmeasurement devices	Two	
5	Standard Voltage Ratio		
(a)Winding-1	132kV/□3/110V/□3	220kV□3/110V□3	
(b)Winding-II	132kV/□3/110V/□3	220kV□3/110V□3	
6	Rated Secondary Burden(VA)		
(a)Winding-1	50	50	
(b)Winding-II	50	50	
7	Accuracy Class		
(a)Winding-1	0.2/0.2S		
(b)Winding-II	0.2/0.2S		
8	Rated Voltage Factor and Duration		
(a)Winding-1	1.25 continuous and 1.5 for 30 seconds		
9	Reference Standard for insulating oil	IS 335 with latest amendments	

Annexure-DMinimum Acceptable Specifications Of DedicatedSingle-Phase Hv Potential Transformers (Pt) For Metering

Sr. No.	Particulars	33kV
1	Nominal System Voltage (kVrms)	33
2	Highest System Voltage (kVrms)	36
3	Reference Standard	IS 3156 with latest amendments
4	No. of Secondary Windings for potentialmeasurement devices	Two
5	Standard Voltage Ratio (for both windings)	33kVN3/110VH3
6	Rated Secondary Burden(VA) per winding	
	(a)Winding-1	50
	(b)Winding-II	50
7	Accuracy Class (At 10% to 100% of rated VAburden)	
	(a)Winding-1	0.2/0.2S
	(b)Winding-II	0.2/0.2S
8	Rated Voltage Factor and Duration	1.25 continuous and 1.5 for 30

seconds

Annexure-EMinimum Acceptable Specifications Of DedicatedThree-Phase HV Ct-Pt Set For Metering

Sr. No.	Particulars	
33kV		
	Specification of CT (for CT-PT Set)	
1	Nominal System Voltage (kVrms)	The CT-PT combined metering unit is not used intransmission system
2	Highest System Voltage (kVrms)	
3	Reference Standard	
4	Standard CT Ratio(Amps/Amps)	
5	Rated continuous thermal current	
6	Rated short time thermal primary current for 1second (inkA)	
7	CT Characteristic:	
(a)	Rated Primary Current(Amps)	
(b)	Rated Secondary Current (Amps)	
(c)	Accuracy Class	
(d	Maximum Instrument Security Factor (ISF)	
(e)	Rated Secondary Burden (VA)	
8	Reference Standard for insulating oil	
	Specification of PT (for CT-PT Set)	
1	Nominal System Voltage(kVrms)	
2	Highest System Voltage(kVrms)	
3	Reference Standard	
4	No. of Secondary Windings for potentialmeasurement devices	
5	Standard Voltage Ratio	
6	Rated Secondary Burden(VA) per winding	
7	Accuracy Class (At 10% to 100% of rated VAburden)	
8	Rated Voltage Factor and Duration	

Part VI

Data Registration Code

17. Section 17

Data Registration17.1Introduction. - This section contains a list of all data required by STU and SLDC, which is to be provided by Users, and data required by Users to be provided by STU at times specified in the Grid Code. Other section of the Grid Code contains the obligation to submit the data and defines the times when data is to be supplied by Users.17.2Objective. - The objective of the section is to list all the data required to be provided by Users to STU and vice versa, in accordance with the provisions of the Grid Code.17.3Responsibility. - All Users are responsible for submitting up-to-date data to STU/SLDC in accordance with the provisions of the Grid Code.All Users shall provide STU and SLDC with the name, address and telephone number of the person responsible for sending the data.STU shall inform all Users and SLDC of the name, address and telephone number of the person responsible for receiving data.STU shall provide up-to-date data to Users as provided in the relevant schedule of the Grid Code.Responsibility for the correctness of data rests with the concerned User providing the data.17.4Data Categories and Stages in Registration. - Data required to be exchanged has been listed in the appendices of this section under various categories with cross-reference to the concerned sections.17.5Changes to Users Data. - Whenever any User becomes aware of a change to any items of data that is registered with STU, the User must promptly notify STU of the changes. STU on receipt of intimation of the changes shall promptly correct the database accordingly. This shall also apply to any data compiled by STU regarding to its own system.17.6Methods of Submitting Data. - The data shall be furnished in the standard formats for data submission and such format must be used for the written submission of data to SLDC/STU.Where standard format are not enclosed these would be developed by SLOG/STU in consultation with Users.All data to be submitted under the Schedule(s) must be submitted to SLDC/STU or to such other department and/or address as STU may from time to time notify to Users. The name of the Person who is submitting each schedule of data must be indicated.Where a computer data link exists between a User and SLDC/STU, data may be submitted via this link. The data shall be in the same format as specified for paper transmission except for electronic encoding for which some other format may be more suited. The User shall specify the method to be used in consultation with the SLDC/STU and resolve issues such as Protocols, transmission speeds etc. at the time of transmission.Other modes of data transfer, such as magnetic tape may be utilised if SLDC/STU gives its prior written consent.17.7Data not supplied. - Users are obliged to supply data as referred to in the individual section of the Grid Code and listed out in the Data Registration section Appendices. In case any data is missing and not supplied by any User, STU. or SLDC may, acting reasonably, if and when necessary may estimate such data depending upon the urgency of the situation. Similarly, in case any data is missing and not supplied by STU, the concerned User may, acting reasonably, if and when necessary mat estimate 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 STU or SLDC, as the case may be, deemed appropriate.17.8Special Considerations. - STU or SLDC and any other User may at any time make reasonable request for extra data as necessary.STU shall supply data, required/requested by SLDC for system operation, from data bank to SLDC.AppendixAppendix A: Standard Planning DataStandard Planning Data consist of details, which are expected to be normally sufficient for STU to investigate the impact on the State Transmission System due to User development.Standard planning data covering (a) preliminary project planningReference To:Section - 4 System

PlanningSection - 5 Connection ConditionA1 Standard Planning Data (Generation)For SSGS - ThermalA.1.1 Thermal (Coal/Gas/Fuel Linked)A.1.1.1 General

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

A.1.1.2 Connection

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

A.1.1.3 Station Capacity

i	Total Power Station capacity (MW)	State whether development will be carried out inphases 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, steamtemperature etc.
ii	Steam turbine	State type, capacity
iii	Generator	TypeRating (MVA)Speed (RPM)Terminal voltage (kV)Rated Power FactorReactive PowerCapability(MVAr) in the range0.95 of leading and 0.85 laggingShort Circuit RatioDirect axis(saturated) transient reactance (% on MVA rating)Direct axis(saturated) sub-transient reactance (% on MVA rating)Auxiliary PowerRequirementMW and MVAr Capability curve
iv	Generator Transformer	TypeRated capacity (MVA)Voltage Ratio (HV/LV)Tap change Range (+ %to - %)Percentage Impedance (Positive Sequence at Fullload)

A.1.2 Hydro ElectricFor SSGS - HydroA.1.2.1 General

Site	Give location map to scale showing roads,railway lines,

	and transmission lines.
Site map (To scale)	Showing proposed canal, reservoir area, waterconductor system, fore-bay, power house etc.
Submerged Area	Give information on area submerged, villagessubmerged, submerged forest land, agricultural land etc

Whether storage typeor run of river type Whether catchment receiving discharges fromother reservoir or power plant.Full reservoir levelMinimum draw downlevel.Tail race levelDesign HeadReservoir level v/s energy potential curveRestraint, if any, in water discharges Approximate period ofconstruction

A.1.2.2 Connection

i	Point of Connection	Give single line diagram proposed Connectionwith 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 inphases and if so furnish details.
ii	No. of units & unit size (MW)	

A.1.2.4 Generating Unit Data

i	Operating Head (in Metres)	a. Maximumb. Minimumc. Average
	Hydro Unit	Capability to operate as synchronous condenserWater head versus discharges curve (at full and part load) Powerrequirement or water discharge while operating as synchronouscondenser
ii	Turbine	State Type and capacity
iii	Generator	TypeRating (MVA)Speed (RPM)Terminal voltage (kV)Rated Power FactorReactive PowerCapability (MVAr) in the range 0.95 of leading and 0.85 oflaggingMW & MVArcapability curve of generating unitShort Circuit RatioDirect axis transient(saturated) reactance (')/0 on rated MVA)Direct axissub-transient (saturated) reactance (% on rated MVA)Auxiliary Power Requirement (MW)
iv	Generator - Transformer	a. Typeb. Rated Capacity(MVA)c. Voltage RatioHV/LVd. Tap change Range(+% to -%)e. Percentage Impedance (Positive Sequence atFull Load).

A.2 Standard Planning Data (Transmission) For Stu and Transmission LicenseesNote. - The compilation of the data is the internal matter of STU, and as such STU shall make arrangements for

getting the required data from different Departments of STU/other transmission licensees (if any) to update its Standard Planning Data in the format given below:

i Name of line (Indicating Power Stations andsubstations to be connected).

ii Voltage of line IkV).

iii No. of circuits.

iv Route length (km).

v Conductor sizes.

vi Line parameters (PUvalues).a. Resistance/kmb. Inductance/kmc. Susceptance/km (B/2)

vii Approximate power flow expected- MW & MVAr.

viii Terrain of the route- Give information regardingnature of terrain i.e. forest land, fallow land, agricultural andriver basin, hill slope etc.

ix Route map (to scale) - Furnish topographical mapshowing the proposed route showing existing power lines andtelecommunication lines.

x Purpose of Connection- Reference to Scheme,wheeling to other States etc.

xi Approximate period of Construction.

A.3. Standard Planning Data (Distribution) For Discoms and Distribution LicenseesA.3.1 General

i	Area Map (to scale)	Marking the area in the map of Madhya Pradeshfor which Distribution License is applied.
ii	Consumer Data	Furnish categories of consumers, their numbersand connected loads.
iii	Furnish categories of consumers, their numbersand connected loads.	

A.3.2 Connection

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

A.3.3 Lines and Substations

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

A.3.4 Loads

i Loads drawn at points of Connection.

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

iii Reactive Power compensation installed

A.3.5 Demand Data (For All Loads 1 MW And Above)

i Type of load

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

A.3.6 Load Forecast Data. - Peak load and energy forecast for each category of loads for each of the succeeding 5 years. Details of methodology and assumptions on which forecasts are based.If supply is received from more than one substation, the sub-station wise break up of peak load and energy projections for each category of loads for each of the succeeding 5 years along with estimated Daily load curve.Details of loads 1 MW and above.

Name of prospective consumer.

Location and nature of load/complex.

Sub-Station from which to be fed.

Voltage of supply.

Phasing of load.

Appendix B: Detailed Planning DataRefer To:Section - 4 System PlanningSection - 5 Connections ConditionsB.1 Detailed Maiming Data (Generation)Part-I For Routine SubmissionB.1.1 Thermal Power StationsFor SSGS - ThermalB.1.1.1 General. - Name of Power Station.

2. Number and capacity of Generating Units (MVA).

3. Ratings of all major equipments (Boilers and major accessories, Generator Unit Transformers etc).

4. Single line Diagram of Power Station and switchyard.

5. Relaying and metering diagram.

6. Neutral Grounding of Generating Units.

7. Excitation control- (What type is used? e.g. Thyristor, Fast Brushless

8. Earthing arrangements with earth resistance values.

B.1.1.2 Protection And Metering.i. Full description including settings for all relays and protection systems Generating Unit, Generator unit Transformer, Auxiliary Transformer motor of major equipments listed, but not limited to, under Sec. 3ii. Full description including settings for all relays installed on all outgoing Power Station switchyard, Tie circuit breakers, and incoming circuitiii. Full description of inter-tripping of circuit breakers at the point or points with the Transmission System.iv. Most probable fault clearance time for electrical faults on the User'sv. Full description of operational and commercial metering schemes.B.1.1.3 Switchyard. - In relation to interconnecting transformers:

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

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

i	Rated voltage (kV).
ii	Type of circuit breaker (MOCB/ABCB/SF6).
iii	Rated short circuit breaking current (kA) 3phase.
iv	Rated short circuit breaking current (kA) 1phase.
v	Rated short circuit making current (kA) 3 phase.
vi	Rated short circuit making current (kA) 1-phase.
vii	Provisions of autore-closing with details.(a) LightningArresters -(b)Technical data(c) Communication -(d) Details ofCommunications equipment installed at points of connections.(e) Basic InsulationLevel (kV)i. Bus bar.ii. Switchgear.iii. Transformer Bushings iv. Transformer windings.

B.1.1.4 Generating UnitsParameters of Generator. - i. Rated terminal voltage (kV).ii. Rated MVA.iii. Rated MW.iv. Speed (rpm) or number of poles.v. Inertia constant H (MW sec./MVA).vi. Short circuit ratio.vii. Direct axis synchronous reactance Xd (% on MVA).viii. Direct axis (saturated) transient reactance (% on MVA) X'd.ix. Direct axis (saturated) sub-transient reactance (% on MVA)x. Quadrature axis synchronous reactance (% on MVA) Xq.xi. Quadrature axis (saturated) transient reactance (% onxii. Quadrature axis (saturated) sub-transient reactance (% onxiii. Direct

axis transient open circuit time constant (sec) T'do.xiv. Direct axis sub-transient open circuit time constant (sec)xv. Quadrature axis transient open circuit time content (sec)xvi. Quadrature axis transient open circuit time constant (sec)xvii. Stator Resistance (Ohm) Ra.xviii. Stator leakage reactance (Ohm) Xi.xix. Stator time constant (Sec).xx. Rated Field current (A).xxi. Neutral grounding details.xxii. Open Circuit saturation characteristics of the Generator for various terminal voltages giving the compounding current to achieve this.xxiii. MW and MVAr Capability curve.B.1.1.5 Parameters of excitation control system:

i Type of Excitation

ii Maximum field Voltage

iii Minimum field voltage

iv Rated Field Voltage.

v Details of excitation loop in block diagramstransfer functions of individual elements using symbols. showing1.E.E.E.

vi Dynamic characteristics of over - excitationlimiter.

vii Dynamic characteristics of under-excitationlimiter

B.1.1.6 Parameters of governor. - i. Governor average gain (MW/Hz).ii. Speeder motor setting range.iii. Time constant of steam or fuel Governor valve.iv. Governor valve opening limits.v. Governor valve rate limits.vi. Time constant of Turbine.vii. Governor block diagram showing transfer functions of individual elements I.E.E.E. symbols.B.1.1.7 Operational parameters. - i. Minimum notice required to synchronise a Generating Unit from de-ii. Minimum time between synchronizing different Generating Units in a Poweriii. The minimum block load requirements on synchronizing.iv. Time required for synchronizing a Generating Unit for the followinga. Hotb. Warmc. Coldv. Maximum Generating Unit loading rates for the following conditions:a. Hotb. Warmc. Coldvi. Minimum load without oil support (MW).B.1.1.8 General Status

i Detailed Project report.

ii Status Report

ii Status Report(a) Land(b) Coal(c) Water(d) Environmental clearance(e) Rehabilitation of displaced persons\

iii Techno-economic approval by Central ElectricityAuthority (CEA).

iv Approval of State Government/Government ofIndia.

v Financial Tie-up.

B.1.1.9 Connection. - i. Reports of Studies for parallel operation with the State Transmission System

(a) Short Circuit studies

(b) Stability Studies.

(c) Load Flow Studies.

ii. Proposed Connection with the State Transmission System

(a) Voltage

(b) No. of circuits

(c) Point of Connection.

B.1.2 Hydro - Electric StationsFor SSGS - HydroB.1.2.1 General

i Name of Power Station.

ii No and capacity of units. (MVA)

iii Ratings of all majorequipment(a)Turbines (HP)(b) Generators (MVA)(c) GeneratorTransformers (MVA)(d) Auxiliary Transformers (MVA)

iv Single line diagram of Power Station andswitchyard.

v Relaying and metering diagram.

vi Neutral grounding of Generator.

vii Excitation control.

viii Earthing arrangements with earth resistancevalues.

ix Reservoir Data.(a) Salient features(b) Type of Reservoiri. Multipurposeii. For Power(c) Operating Tablewithi. Area capacity curves andii. Unit capability at different net heads

B.1.2.2 Protection

i Full description including settings for allrelays and protection systems installed on the Generating Unit,Generator transformer, auxiliary transformer and electrical motorof major equipment included, but not limited to those listed,under Sec. 3 (General).

ii Full description including settings for allrelays installed on all outgoing feeders from Power Stationswitchyard, tiebreakers, and incoming breakers.

iii Full description of inter-tripping of breakersat the point or points of Connection with the TransmissionSystem.

iv Most Probable fault clearance time forelectrical faults on the User's System.

8.1.2.3Switchyard.(a)Interconnecting transformers:

i Rated MVA

ii Voltage Ratio

iii Vector Group

iv Positive sequence reactance for maximum, minimumand normal Tap.(% on MVA).

v Positive sequence resistance for maximum,minimum and normal Tap.(% on MVA).

vi Zero sequence reactance (% on MVA)

vii Tap changer range (+% to -%) and steps.

viii Type of Tap changer (off/on load).

ix Neutral grounding details.

(b)Switchgear (including circuit breakers, Isolators on all circuits connected to the points of Connection).

i Rated voltage (kV).

ii Type of Breaker (MOCB/ABCB/SF6).

iii Rated short circuit breaking current (kA) 3phase.

iv Rated short circuit breaking current (kA) 1phase.

v Rated short circuit making current (kA) 3 phase.

vi Rated short circuit making current (kA) 1 phase.

vii Provisions of auto re-closing with details.

(c)Lightning ArrestersTechnical data(d)CommunicationsDetails of Communications equipment installed at points of connections.(e)Basic Insulation Level

i Bus bar.

ii Switchgear.

iii Transformer Bushings

iv Transformer windings.

8.1.2.4Generating Units. - (a) Parameters of Generatori. Rated terminal voltage (kV).ii. Rated MVA.iii. Rated MW.iv. Speed (rpm) or number of poles.v. Inertia constant H (MW sec./MVA).vi. Short circuit ratio.vii. Direct axis synchronous reactance Xd (% on MVA).viii. Direct axis (saturated) transient reactance (% on MVA) X'd.ix. Direct axis (saturated) sub-transient reactance (% on MVA) X"d.x. Quadrature axis synchronous reactance (% on MVA) Xq.xi. Quadrature axis (saturated) transient reactance (% on MVA) X'q.xii. Quadrature axis (saturated) sub-transient reactance (% on MVA)xiii. Direct axis transient open circuit time constant (sec) T'do.xiv. Direct axis sub-transient open circuit time constant (sec) T"do.xv. Quadrature axis transient open circuit time content (sec) T'qo.xvi. Quadrature axis transient open circuit time constant (sec) T"qo.xvii. Stator Resistance (Ohm) Ra.xviii. Stator leakage reactance (Ohm) Xi.xix. Stator time constant (Sec).xx. Rated Field current (A).xxi. Neutral grounding details.xxii. Open Circuit saturation characteristics of the Generator for various terminal voltages giving the compounding current to achieve this.xxiii. Type of Turbine.xxiv. Operating Head (Metres)xxv. Discharge with full gate opening (cumecs)xxvi. Speed Rise on total Load throw off (%).xxvii. MW and MVAr Capability curve(b){||-| Parameters of excitation control system:| As applicable to thermal Power Stations|}(e){||-| Parameters of governor:| As applicable to thermal Power Station|}(d)Operational parameter:

i Minimum notice required to Synchronise aGenerating Unit from resynchronisation.

ii Minimum time between Synchronising differentGenerating Units in a Power Station.

iii Minimum block load requirements onSynchronising.

B.1.2.5 General Status

i Detailed Project Report.

ii Status Report.(a) Topographicalsurvey(b) Geological survey(c) Land(d) EnvironmentalClearance(e) Rehabilitation of displaced persons.

iii Techno-economic approval by Central ElectricityAuthority

iv Approval of State Government/Government ofIndia.

v Financial Tie-up.

B.1.2.6 Connection.i. Reports of Studies for parallel operation with the State Transmission System

(a) Short Circuit studies

(b) Stability Studies.

(c) Load Flow Studies.

ii. Proposed Connection with the State Transmission System

(a) Voltage

(b) No. of circuits

(c) Point of Connection.

B.1.2.7 Reservoir Data.(a)Dead Capacity(b)Live CapacityB.1.3 Gas Power StationsFor SSGS - GasB.1.3.1 General

i Name of Power Station.

ii Number and capacity of Generating Units (MVA).

iii. Ratings of all major equipments (Turbines,Alternators, Heat Recovery Boiler, Generator Unit Transformersetc)

iv Single line Diagram of Power Station andswitchyard.

v Relaying and metering diagram.

vi Neutral Grounding of Generating Units.

vii Excitation control- (What type is used? e.g.Thyristor, Fast Brushless Exciters)

viii Earthing arrangements with earth resistancevalues.

ix Start up Engine

x Turbine Details

B.1.3.2 Protection and Metering

i Full description including settings for allrelays and protection systems installed on the Generating Unit,Generator unit Transformer, Auxiliary Transformer and electricalmotor of major equipments listed, but not limited to, under Sec.3 (General).

ii Full description including settings for allrelays installed on all outgoing feeders from Power Stationswitchyard, Tie circuit breakers, and incoming circuit breakers.

iii Full description of inter-tripping of circuitbreakers at the point or points of Connection with theTransmission System.

iv Most probable fault clearance time forelectrical faults on the User's System.

v. Full description of operational and commercialmetering schemes.

B.1.3.3 Switchyard. - In relation to interconnecting transformers:

i Rated MVA.

ii Voltage Ratio

iii Vector Group.

iv Positive sequence reactance for maximum,minimum, normal Tap.(% on MVA).

v Positive sequence resistance for maximum,minimum, normal Tap.(% on MVA).

vi Zero sequence reactance (% on MVA).

vii Tap changer Range (+% to -%) and steps.

viii Type of Tap changer. (off/on load).

In relation to switchgear including circuit breakers, isolators on all circuits connected to

i Rated voltage (kV).

ii Type of circuit breaker (MOCB/ABCB/SF6).

iii Rated short circuit breaking current (kA) 3phase.

iv Rated short circuit breaking current (kA) 1phase.

v Rated short circuit making current (kA) 3 phase.

vi Rated short circuit making current (kA) 1-phase.

vii Provisions of autore-closing with details. Lightning Arresters -Technical dataCommunication -Details ofcommunication equipment installed at points of connections. BasicInsulation Level (kV) -i. Bus bar.ii. Switchgear.iii. Transformer bushings.iv. Transformer windings.

B.1.3.4 Generating Units.(a)Parameters of Generating Units:

i Rated terminal voltage(kV).

ii Rated MVA.

iii Rated MW.

iv Speed (rpm) or number of poles.

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

vi Short circuit ratio.

vii Direct axis synchronous reactance (% on MVA) Xd.

viii Direct axis (saturated) transient reactance (%on MVA) Xd'.

ix Direct axis (saturated) sub-transient reactance(% on MVA) Xd".

x Quadrature axis synchronous reactance (% onMVA)Xq.

xi Quadrature axis (saturated) transient reactance(% on MVA) Xq'.

xii Quadrature axis (saturated) sub-transientreactance (% on MVA) Xq".

xiii Direct axis transient open circuit time constant(Sec) T'do.

xiv Direct axis sub-transient open circuit timeconstant (Sec) T"do.

xv Quadrature axis transient open circuit timeconstant (Sec) T'qo.

xvi Quadrature axis sub-transient open circuit timeconstant (Sec) T"qo.

xvii Stator Resistance (Ohm) Ra.

xviii Neutral grounding details.

xix Stator leakage reactance (Ohm) X1

xx Stator time constant(Sec).

xxi Rated Field current (A).

xxii Open Circuit saturation characteristic forvarious terminal Voltages giving the compounding current toachieve the same.

xxiii MW and MVAr Capability curve

B.1.3.5 Parameters of excitation control system:

i Type of Excitation.

ii Maximum Field Voltage.

iii Minimum Field Voltage.

iv Rated Field Voltage.

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

vi Dynamic characteristics of over - excitationlimiter.

vii Dynamic characteristics of under-excitationlimiter.

B.1.3.6 Parameters of governor:

i Governor average gain (MW/Hz).

ii Speeder motor setting range.

iii Time constant of steam or fuel Governor valve.

iv Governor valve opening limits.

v Governor valve rate limits.

vi Time constant of Turbine.

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

B.1.3.7 Operational parameters:

i Minimum notice required synchronising aGenerating Unit from de; synchronization.

ii Minimum time between synchronizing differentGenerating Units in a Power Station.

iii The minimum block load requirements onsynchronizing.

iv Time required forsynchronizing a Generating Unit for the following conditions:a. Hotb. Warmc. Cold

v Maximum GeneratingUnit loading rates for the following conditions:a. Hotb. Warmc. Cold

vi Minimum load without oil support (MW).

B.1.3.8 General Status

i Detailed Project report

ii Status Report(a) Land(b) Gas/Liquid Fuel(c) Water(d) Environmentalclearance(e) Rehabilitation of displaced persons

iii Approval of State Government/Government ofIndia.

iv Financial Tie-up.

B.1.3.9 Connection.i. Reports of Studies for parallel operation with the State Transmission System.

(a) Short Circuit studies

(b) Stability Studies.

(c) Load Flow Studies.

ii. Proposed Connection with the State Transmission System.

(a) Voltage

(b) No. of circuits

(c) Point of Connection.

B.2 Detailed System Data TransmissionFor STU and Transmission LicenseesB.2.1 General.i. Single line diagram of the Transmission System down to 33kV bus at Grid Sub-station detailing:

(a) Name of Sub-station.

(b) Power Station connected.

(c) Number and length of circuits.

(d) Interconnecting transformers.

(e) Sub-station bus layouts.

(f) Power transformers.

(g) Reactive compensation equipment.

ii. Sub-station layout diagrams showing:

(a) Bus bar layouts.

(b) Electrical circuitry, lines, cables,transformers, switchgear etc.

(c) Phasing arrangements.

(d) Earthing arrangements.

(e) Switching facilities and interlockingarrangements.

(f) Operating voltages.

(g) Numbering andnomenclature:i. Transformers.ii. Circuits.iii. Circuitbreakers.iv. Isolating switches.

B.2.2 Line Parameters (For All Circuits)

i Desiynation of Line.

ii Length of line(km).

iii Number of circuits.

iv Per Circuit values.(a) Operating voltage(kV).(b) Positive Phasesequence reactance (pu on 100 MVA) X1(c) Positive Phasesequence resistance (pu on 100 MVA) R1(d) Positive Phasesequence susceptance (pu on 100 MVA) 81(e) Zero Phasesequence reactance (pu on 100 MVA) XO(f) Zero Phasesequence resistance (pu on 100 MVA) RO(g) Zero Phase sequence susceptance (pu on 100MVA) BO

B.2.3 Transformer Parameters (For All Transformers).i. Rated MVAii. Voltage Ratioiii. Vector Groupiv. Positive sequence reactance, maximum, minimum and normal (pu on)v. Positive sequence resistance, maximum, minimum and normal (pu on)vi. Zero sequence reactance (pu on 100 MVA).vii. Tap change range (+% to -%) and steps.viii. Details of Tap changer. (Off/On load).B.2.4 Equipment Details (For All Substations).i. Circuit Breakersii. Isolating switchesiii. Current Transformersiv. Potential TransformersB.2.5 Relaying and Metering.i. Relay protection installed for all transformers and feeders along with 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 generation).ii. Transient stability studies for three-phase fault in critical lines.iii. Dynamic Stability Studiesiv. Short circuit studies (three-phase and single phase to earth)v. Transmission and Distribution Losses in the Transmission System.B.2:7 Demand Data (For All Substations).i. Demand Profile (Peak and lean load).B.2.8 Reactive Compensation Equipment.i. Type of equipment (fixed or variable).ii. Capacities and/or Inductive rating or its operating range in MVAr.iii. Details of control.iv. Point of Connection to the System.B.3. Detailed Planning Data (Distribution).For Discoms/Distribution LicenseesB.3.1 General

i Distribution map (To scale). Showing all linesup to 11kV and sub-stations belonging to the Supplier.

ii Single line diagram of Distribution System(showing distribution lines from points of Connection with theTransmission System, 33/11kV substations, 11/0.4kV substation,consumer bus if fed directly from the Transmission System).

iii Numbering and nomenclature of lines andsub-stations (Identified with feeding Grid sub-stations of theTransmission and concerned 33/11kV substation of Supplier).

B.3.2 Connection

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

ii Details of metering at points of Connection.

B.3.3 Loads

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

ii Information on diversity of load and coincidencefactor.

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

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

Appendix C: Operational Planning DataC.1 Outage Planning DataRefer To:Section 11 Outage PlanningC.1.1 Demand EstimatesFor Discoms/Distribution Licensees

Items	Due date/Time
Estimated aggregate annual sales of Energy inMillion Units and peak and lean demand in MW & MVAr at eachConnection point for the next financial year.	15th November of year current
Estimated aggregate monthly sales of Energy inmillion Units and peak and lean demand in MW & MVAr at eachConnection point for the next month.	25th of current month
Hourly demand estimates for the day ahead.	10.00 Hours every day.

C.1.2 Estimates of Load SheddingFor Discoms/Distribution Licensee

Items	Due date/ Time
Details of discrete load blocks that may be shedto comply with instructions issued by SLDC when required, fromeach Connection point.	Soon after Connection is made

C.1.3 Year Ahead Outage Programme (For The Financial Year)C.1.3.1 Generator Outage ProgrammeFor SSGS

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

C.1.3.2 Year Ahead WRPC Outage Programme (Affecting Transmission System)

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

C.1.3.3 Year Ahead CPP's Outage Programme

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

C.1.3.4 Year Ahead Discom's Outage Programme

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

C.1.3.5 Stu's Overall Outage Programme

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

C- 2. Generation Scheduling DataRefer To Section 8: Schedule And DispatchC-3 Capability DataRefer To: Section 9 Frequency And Voltage Management:For SSGS

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

C-4 Response To Frequency P. HangzRefer To: Section 9 - Frequency and Voltage ManagementFor SSGS

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

C-5 Monitoring of GenerationRefer To: Section 10 Monitoring of Generation and Drawn.For SSGS

Items	Due date/Time
SSGS shall provide hourly generation summationto SLDC.	Real time basis
CPPs shall provide hourly export/import MW toSLDC.	Real time basis
Logged readings of Generators to SLDC.	As required
Detailed report of Generating Unit tripping onmonthly basis.	In the first week succeeding month of the

C-6 Essential and Non-Essential Load DataRefer To: Section 12 Contingency PlanningFor Discoms/distribution Licensee

Items	Due date/Time
Schedule of essential and non-essential loads oneach discrete load block for purposes of load shedding.	As soon as possible after Connection

Appendix D: Protection DataRefer To:Section 15 - Protection

Item	Due date/Time
For SSGSGenerators/CPPs/IPPs shall submit details ofprotection requirement and schemes installed by them as referredto in B-1. Detailed Planning Data under sub-section "ProtectionAnd Metering".	As applicable Planning Data to Detailed PlanningData
ForSTU/Transmission LicenseeThe STU shall submit details of protectionequipment and schemes installed by them as referred to in B-2.Detailed system Data, Transmission under sub-section "Relayingand Metering" in relation to Connection with any User.	As applicable to Detailed Planning Data

For SSGSAppendix E: Metering DataRefer To:Section -16 Transmission Metering

Item	Due date/Time
For SSGSSSGS shall submit details of metering equipmentand scheme installed by them as referred in B-1. DetailedPlanning Data Planning Data under sub-section "Protectionand Metering".	As applicable to Detailed Planning Data
ForSTU/Transmission LicenseeSTU shall submit details of metering equipmentand schemes installed by them as referred in B-2. DetailedPlanning Data System Data, Transmission under sub-section"Relaying and Metering" in relation to Connection withany User.	As applicable to Detailed Planning Data

Appendix F: Planning StandardsRefer To:Section - 4 System PlanningGeneral Policy. - The State Transmission System planning and generation expansion planning shall be in accordance with the provisions of the Planning Criterion as per IEGC Clause 3.5 as detailed below. However, some planning parameters of the State Transmission System may vary according to directives of MPERC.Planning Criterion. - (a) The planning criterion is based on the security philosophy on which ISIS and State Transmission System has been planned. The security philosophy shall be as per the Transmission Planning Criteria and other CEA guidelines. The general policy shall be as detailed below:(i)As a general rule, the ISTS shall be capable of withstanding and secured against the following contingency outages without necessitating load shedding or rescheduling of generation during Steady State Operations:Outage of a 132kV D/C line or,Outage of a 220kV D/C line or,Outage of a 400kV S/C line or,Outage of a single Interconnecting Transformer, or,Outage of one pole of HVDC Bipole line, or,Outage of a 765kV S/C line.(ii)The above contingencies shall be considered assuming a pre-contingency system depletion (Planned Outage) of another 220kV D/C line or 400kV S/C line in another corridor and not emanating from same sub-station. 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 ISTS/STS shall be capable of withstanding the loss of most severe single system in feed without loss of stability.(c)Any one of these events defined above shall not cause:

i Loss of supply

ii Prolonged operation of the system frequencybelow and above specified limits

iii Unacceptable high or low voltage

iv System instability

v Unacceptable overloading of ISTS/STS elements

Appendix G: Site Responsibility ScheduleRefer To: Section - 5 Connection Conditions

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

Generating Units

Name of Power Station/Sub-StationSite Owner: Tel. Number: Fax Number:Appendix H: Incident ReportingRefer To:Section -14: Operational Event/Incidence reporting

Flash Report :

SLDC/STU/users/transmissionLicensee/generators

Agency Name/Month-Year/GD or GL- Number

Name of Incident:

1. Date and Time:

2. Antecedent Conditions

I. Frequency of NEW Grid/SR Grid

Event	Frequency	Time(hh.mm)
Pre incident		
Post Incident		

II. Demand Met - MW

State Generation - MW

State Load - MW

3. Event Description:Event and Likelycause as reported by SLDC./State Entities and as observed.

4. Lines/ICT/Units tripped and Restoration

Lines/ICT/Unit Tripped	Load prior to fault	Tripping time	Restoration Time

5. Areas Affected By Disturbance :

6. Load Loss :

7. Generation Loss :

8.Supply Resumed From