

UTTARAKHAND ELECTRICITY REGULATORY COMMISSION
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NOTIFICATION

05 April 2007

Uttarakhand Electricity Regulatory Commission
(Distribution Code) Regulations, 2007

No. F-(9)13/RG/UERC/2007/19 - In exercise of the powers conferred on it by Section 14 of the Electricity Act 2003, read with Section 181 of the said Act and clause 18 of Distribution and Retail Supply Licence and all powers enabling it in that behalf, the Uttarakhand Electricity Regulatory Commission hereby makes the following Regulations:

CHAPTER 1: GENERAL

1.1 Short Title, Commencement and Interpretation

- (1) These Regulations may be called the “Uttarakhand Electricity Regulatory Commission (Distribution Code) Regulations, 2007”.
- (2) This Regulation shall be applicable to all Distribution System participants including
 - (a) Distribution Licensee;
 - (b) Open Access Customers connected to Distribution Systems;
 - (c) Other Distribution Licensee connected to Distribution Systems;
 - (d) Embedded Generators; and
 - (e) Large Consumers
- (3) These Regulations shall come into force on the date of the publication in the official Gazette.
- (4) These Regulations shall be interpreted and implemented in accordance with, and not at variance from, the provisions of the Electricity Act, 2003 read with the Indian Electricity Rules, 1956 and any Central Electricity Authority regulations in this regard.

1.2 Definitions

- (1) In the Distribution Code the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the following meanings:
- (a) “Act” means the Electricity Act, 2003 (Act no. 36 of 2003).
 - (b) “Agreement” means an agreement entered into by the Distribution Licensee and the User.
 - (c) “Apparatus” means electrical apparatus and includes all machines, fittings, accessories and appliances connected to the Electrical Distribution System.
 - (d) “CBIP” means Central Board of Irrigation and Power
 - (e) “CEA” means Central Electricity Authority
 - (f) “Circuit” means an arrangement of conductor(s) for the purpose of conveying electrical energy and forming a system or a branch of system.
 - (g) “Commission” means Uttarakhand Electricity Regulatory Commission.
 - (h) “Conductor” means any wire, cable, bar, tube, rail or plate used for conducting energy and electrically connected to the system.
 - (i) “Connected Load” means aggregate of the manufacture’s rating of all energy consuming apparatus duly wired and connected to the power supply system of licensee including portable apparatus in the consumer’s premises. This shall not include the load of spare plug, sockets, load exclusively installed for fire fighting purposes. The load of either water and room heating or room cooling apparatus, which ever is higher, shall be taken into account as per prevailing season (1st April to 30th September for cooling use and 1st October to 31st March for heating use).
- The definition of connected load shall be used only for the purpose of assessment in case of direct theft or dishonest abstraction of energy or unauthorised use of energy.

- (j) “Control Person” means a person identified as having technical capability and responsibility for cross boundary safety.
- (k) “DCR” means Distribution Code Review.
- (l) “DCRP” means Distribution Code Review Panel.
- (m) “Embedded” means having a direct electrical connection to an intra state electrical system.
- (n) “Extra High Tension (EHT)” means the voltage 33000 Volts and above under normal conditions subject to the percentage variation permissible under the Indian Electricity Rules 1956.
- (o) “GSS” means Grid Sub-station.
- (p) “High Tension (HT)” means the voltage between 650 volts and 33000 Volts under normal conditions subject to the percentage variation permissible under the Indian Electricity Rules 1956.
- (q) “Indian Standards (“IS”)” means those Standards and specifications approved by the Bureau of Indian Standards.
- (r) “Interface Point” means a point at which a User’s electrical system is connected to the Licensee’s Distribution System.
- (s) “Low Tension (LT)” means the voltage of 230 volts between phase and neutral or 400 volts between any two phases under normal conditions subject to the percentage variation permissible under the Electricity Rules.
- (t) “Power Factor” means the ratio of Active Power (kW) to Apparent Power (KVA).
- (u) “PTW” means permit to work.
- (v) “REC” means Rural Electrification Corporation.
- (w) “Transmission System” means the system consisting of extra high voltage electric lines being operated at EHT (excluding generator interconnection facilities) owned and/or operated by the Transmission Licensee for the purposes of the transmission of electricity from one power station to a sub-station or to another power station or between sub-stations or to or from any external

interconnection equipment up to the interconnection with the distribution system, any plant and apparatus and meters owned or used by the Transmission Licensee in connection with the transmission of electricity, but shall not include any part of the Licensee distribution system.

- (x) "User" means any person having electrical interface with, or using the Distribution System of the Distribution Licensee to whom this Code is applicable. Any other Distribution Licensee, Transmission Licensee and generating units connected to the Distribution system are also included in this term.
- (y) All Words and expressions used and not defined in these regulations but defined in the Electricity Act, 2003 shall have the meanings as assigned to them in the said Act.

1.3 Objectives

- (1) To ensure that distribution system is developed and maintained in an efficient, coordinated and economical manner and the Distribution Licensee and all Distribution System participants comply with respective obligations as specified in the Act.
- (2) The Distribution Code brings together a single set of rules, for using the Distribution network and provides the following:
 - (a) Technical aspects of working relationship between the Licensee's Distribution system and to those connected and seeking connection to it.
 - (b) Facilitation of the operation, maintenance, development and planning of economic and reliable power distribution network.

1.4 Scope of Distribution Code

- (1) The UPCL Distribution and Retail Supply Licence provides that the Distribution Code shall cover all material technical aspects relating to connections to and the operation and use of the Distribution System including the operation of the electrical lines and electrical plant and

apparatus connected to the Distribution System in so far as relevant to the operation and use of the Distribution System and shall include:

- (a) Distribution planning and connection code containing connection conditions specifying the technical, design and operational criteria to be complied with by any person connected or seeking connection with the Licensee's Distribution System and planning codes specifying the plan required for laying the distribution lines and the services lines in the Area of Supply, the technical and design criteria and procedures to be applied by the Licensee in the planning and development of the Licensee's Distribution System; and
 - (b) A distribution operating code specifying the conditions under which the Licensee shall operate its Distribution System and under which persons shall operate their plant and/or Distribution System in relation to the Licensee's Distribution System, in so far as necessary to protect the security and quality of supply and safe operation of the Licensee's Distribution System under both normal and abnormal operating conditions.
- (2) The Distribution Code is not exhaustive as to the requirements to be complied with by the Distribution Licensee and the Users connected or seeking connection to the Licensee's Distribution System. The Distribution Licensee and all Users/Consumers must also comply with the requirement as laid down in various codes, standard and regulations under relevant laws in force.
- (3) The Distribution Code also deals in terms of distribution management in the event of outages and shortages of Electricity Supply and distribution thereof amongst all the categories of consumers as per the system network requirement. However, consumers having captive power plants shall come to the rescue of the licensee as first priority in the event of outages and shortages and resort to load shedding immediately on instructions from the licensee.

- (4) This Distribution code includes the Distribution System Planning and Security Standards, Distribution System Operation Standards as required in the clause 19 of the UPCL Distribution and Retail Supply Licence. As per clause 19 of the Distribution and Retail Supply Licence:
- (a) The Licensee shall, within six months after this Licence becomes effective, prepare in consultation with the Suppliers, Generating Companies and such other person as the Commission may specify and submit to the Commission for approval, the Licensee's proposal for Distribution System Planning and Security Standards and Distribution System Operating Standards. The proposal should include a statement setting out criteria by which the Licensee's compliance with the standards may be measured. Such criteria should include the number and type of supply interruptions and deviations from the power supply quality standards specified.
- (b) The proposal document must include a statement by the Licensee as to how it proposes to implement the standards so as to:
- (i) ensure a satisfactory degree of standardisation of plant, apparatus, and equipment within the State of Uttarakhand, and
 - (ii) develop and observe a policy on requirement of spare parts

1.5 Implementation and operation of the Distribution Code

- (1) The Licensee shall be responsible for its implementation within its Area of Supply. Users shall comply with the provisions of this code.
- (2) If any User has any difficulty in complying with any of the provisions of the Distribution Code, he shall immediately, without delay, inform to the Distribution Licensee and/ or Commission, as the case may be.
- (3) Any continued non compliance, without reasonable grounds shall constitute a deviation under the Act, and may lead to disconnection of the User's plant or apparatus in line with the provisions of the Electricity Act, 2003 from the Licensee's Distribution System. The responsibility for the

consequences of disconnection including payment of damages and others rests with the User who consistently violates the Distribution Code.

- (4) Non-compliance with any provision of the Distribution Code by the Distribution Licensee shall attract the consequences as provided in the Acts or in the License. However, in the event of non-compliance with the Distribution Code, the Distribution Licensee shall prepare and submit to Commission a plan of action for compliance with the Distribution Code. Commission may exempt the Licensee from compliance of any provisions for a particular period, if it is found that the compliance is not feasible for such period, considering the resources available and the circumstances prevailing.

1.6 Limitations of the Distribution Code

- (1) Nothing contained in this Code should be interpreted as imposing obligations / duties on Consumers / Distribution Licensees greater or more onerous than those mentioned in the Electricity Act, 2003 under relevant clauses.
- (2) The Distribution Code contains procedures for the management of day to day technical situations in the Distribution System, taking into account a wide range of operational conditions likely to be encountered under both normal and abnormal conditions. The Distribution Code cannot foresee all the possible operating conditions. Users must therefore understand and accept that the Distribution Licensee, in such unforeseen circumstances, may be required to act decisively and with due expedition to discharge his obligations under the Licence. Users shall provide such reasonable co-operation and assistance as the Distribution Licensee may require in such circumstances. The concerned Distribution Licensee shall however refer all such cases for ratification in the next meeting of the Distribution Code Review Panel as described under chapter 2 of the code-‘Management of Distribution Code’.

1.7 Confidentiality

Under the terms of Distribution Code, the Distribution Licensee will receive information from Users relating to their business. The Distribution Licensee shall not, other than as required by Distribution Code, disclose such information to any other person without the prior written consent of such informant, unless required by Central/State government departments or the authority.

1.8 Procedures to settle disputes

In the event of any dispute regarding interpretation of any regulations provided in the Distribution Code between any User and the Distribution Licensee, the matter shall be referred to the Distribution Code Review Panel and thereafter to Uttarakhand Electricity Regulatory Commission. Commission's decision shall be final and binding on both the parties.

CHAPTER 2: MANAGEMENT OF DISTRIBUTION CODE

2.1 Objective

The chapter defines the method of managing Distribution Code, pursuing of any changes/ modifications required and the responsibilities of the Distribution Licensees and the Users in this regard. This section facilitates revisions taking into account the views of all parties in an equitable manner.

2.2 Distribution Code Review Panel

- (1) A standing body Distribution Code Review Panel (DCRP) shall be constituted by the Commission comprising of the representatives of Distribution Licensee as well as the Users of the Distribution System in line with the provisions of this Code.
- (2) No change in this Distribution Code, however small or big, shall be made without being deliberated upon and agreed to by the Distribution Code Review Panel and thereafter approved by Commission. However, in an unusual situation where normal day-to-day operation is not possible without revision of some clauses of Distribution Code, a provisional revision may be implemented before approval of Commission is received, but only after discussion at a special Review Panel Meeting convened on emergency basis. Commission should promptly be intimated about the provisional revision. Commission may issue directions required to revise the Distribution Code accordingly as may be specified in those directions and the Distribution Licensee shall promptly comply with any such directions.
- (3) The Distribution Code Review Panel shall be composed of the following members, who shall be notified by Commission.
 - (a) Director (Technical/Operation) of Concerned Distribution Licensee
 - (b) General Manager level officer from other Distribution Licensees in the State;

- (c) General Manager Level officer from STU;
- (d) One member nominated by the SLDC;
- (e) One member representing State owned Generating Company;
- (f) One member representing other Generating Companies in the state;
- (g) One member representing open access consumers;
- (h) One member representing Industrial Consumers;
- (i) One member representing Domestic / Commercial consumers;
- (j) One member representing Agriculture Consumers;

2.3 Terms of Office

The Chairman of the Distribution Code Review Panel shall be Director (Technical / Operation) of Distribution Licensee. The Distribution Code Review Panel shall however be perpetual under the Distribution Code. All members of the Distribution Code Review Panel shall hold office until changed / replaced by the respective parent organization.

2.4 DCR Panel Support Staff and Operating Cost

The Member from Distribution Licensee holding the office of Chairman of DCR Panel at a given time shall provide secretarial staff required to support DCR Panel operations. The cost associated with such secretarial assistance shall also be borne by that Distribution Licensee.

2.5 Functions of the Review Panel

The functions of the Review Panel shall be:

- (1) Maintenance of the Distribution Code and its working under continuous scrutiny and review.
- (2) Consideration of requests for review made by any user and publication of their recommendations for changes in the Distribution Code together with reasons for such changes.
- (3) Provide guidance on interpretation and implementation of the Distribution Code.

- (4) Examination of the problems raised by any User as well as resolution of the problems.
- (5) Ensuring that the changes/modifications proposed in the Distribution Code are consistent and compatible with standard technical manual or guidelines, codes, laws, acts, rules and regulations in force at that point of time.
- (6) Constitution of a sub-committee for detailed study of various matters pertaining to the Distribution Code and circulation of the findings and recommendations to Review Panel Members and the entities concerned.
- (7) Making arrangements for deliberation of the issues (regarding sub committee findings and recommendations) in the Review Panel meetings the time frame, as provided by these sub-committees.
- (8) Holding of meetings as required but at least one meeting shall be held in every three months.
- (9) Holding of meetings by sub-committees including with any User or with groups of Users to prepare proposals for review panel consideration.

2.6 Review and Revisions

- (1) The Users seeking any amendment to the Distribution Code shall send written requests to the Secretary (to be nominated by Distribution Licensee) of the Review Panel with a copy to Commission. If the request is sent to Commission directly, the same shall be forwarded to the Secretary of Review Panel who shall, in consultation with the concerned entities and such other persons as the Commission may direct, review the Distribution Code provisions. The Secretary will circulate the proposed changes/modifications to all the panel members for their written comments within a reasonable time frame or the secretary may call for the Review Panel meeting in consultation with the chairperson. Based on this interaction/ discussion, the necessary amendments/ revisions may be incorporated in Distribution Code after the approval of Commission.
- (2) The secretary shall send the following reports to the Commission at the conclusion of each review meeting of the panel:

- (a) Reports on the outcome of such review.
 - (b) Any proposed revision to the Distribution Code and its rationale.
 - (c) All written representations and objections submitted by the Users at the time of review.
- (3) All revisions to the Distribution Code require the approval of Commission. The secretary shall publish revisions to the Distribution Code, after the approval of Commission. The Review Panel may also submit proposals for relaxation in such cases where Users / Distribution Licensees have difficulties in meeting the requirements of the Distribution Code.
- (4) Any 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 revised version, noting the number of every changed Sub-section, together with reasons for such change.
- (5) The secretary shall maintain copies of the Distribution Code incorporating the latest amendments and shall make it available at a reasonable cost to any person requiring it.
- (6) The Commission, may, on the application of the licensee or otherwise, call the emergency meeting of the review panel as and when the situation so dictates and make such alterations and amendments in the Distribution Code as it thinks fit.

CHAPTER 3: DISTRIBUTION SYSTEM PLANNING

3.1 Objectives

The main objectives of the Distribution System Planning are:

- (1) To enable the planning, design and construction of the Distribution System for a safe, reliable and economical operation conforming to Statutory Acts and Rules, which are in force.
- (2) Specify technical conditions to be followed by the respective Distribution Licensees and Users in meeting the standards for an efficient operation of the common electrical interface.
- (3) To prescribe the procedure for the exchange of the system planning data between the Distribution Licensee and the Users for facilitating synchronised planning of the Distribution System at Licensee and User levels.
- (4) These guidelines of planning cover the individual sub-stations, system planning, analysis and the techno economical aspects in the field of Distribution systems. It applies to all the consumers already connected or awaiting or seeking connection to the distribution system, Distribution Licensees and State Transmission Utility (STU), wherever it is applicable.

3.2 Distribution System Planning Standards

- (1) The Distribution System Planning Standards specify the guidelines for planning methodology of the Distribution System. The scope of these standards covers:
 - (a) Load projections
 - (b) Security Standards
 - (c) Planning procedure.
 - (d) Service area of a distribution network.
 - (e) Planning standards.
 - (f) Reliability analysis.

- (g) Standardisation of design of distribution transformers
 - (h) Standardisation of substation layouts
 - (i) Reactive Compensation
 - (j) Service Mains
 - (k) Metering
 - (l) Quality of power supply
- (2) The Distribution System shall be planned and developed in such a way that the system should be capable of catering the requirement of all categories of Consumers with a safe, reliable, economical and quality supply of electricity. However the Consumer shall extend full support to the Distribution Licensee to enable the Distribution Licensee for quality supply of electricity. The Distribution System shall conform to the statutory requirements of all the relevant code, standards and acts in force.

3.3 Load Data

- (1) From the metered data collected at each interface point with the transmission system, the Licensee shall develop load curves for the area fed and also the system load curve for the area of supply in point by applying a suitable diversity factor.
- (2) The Users with Demands of 1 MVA and above shall furnish their load data/characteristic and other relevant details to the Distribution Licensee as detailed in Annexure 1. The Distribution Licensee shall exercise special care to monitor the actual development of loads in respect of Consumers desiring to avail loads of 1 MVA and above at a single point.
- (3) The Distribution Licensee on his part shall maintain relevant data for designing and selecting the electrical equipment, details of metering and relay for purpose of protection and System data in his Distribution System. The Distribution Licensee shall update the system data regularly and at least once a year.

3.4 Load Forecast

- (1) The Distribution Licensee shall formulate a rolling short-term demand forecast annually for a period of five years in his Area of Supply (to enable the STU in drawing down the annual planning process corresponding to a 5-years forward annual plan for intra state transmission system).
- (2) Energy sales in each tariff class shall be projected in the forecast period after considering the previous financial year as base and projecting the demand for the succeeding 5 years – by adopting suitable methodology, such as considering the trend for previous five years and considering the expected economic and social development of various sectors in his Area of Supply in succeeding five years.
- (3) During this process he shall also review the status of loads materialising as per the previous load forecast. Further these forecasts shall be in line with the plan to be developed at national level by CEA. The Distribution Licensee shall incorporate the variation to the forecast, as and when required.
- (4) The peak load requirements at each Interface Point shall be estimated. However, if the Distribution Licensee receives power at a number of Interface Points in a compact area, which are interconnected in a ring, then the Distribution Licensee shall forward the overall short term Demand forecast at each Interface Point with the variation or tolerance as mutually discussed and agreed upon with the STU.
- (5) Apart from the short term demand forecast for each Interface Point for peak load requirement the Distribution Licensee shall also forward the aggregate energy and peak load demand for Area of Supply on annual basis to the STU, Transmission Licensee and Commission along with the following details on the basis of which the forecast is made - Data, Methodology and Assumptions.
- (6) The peak load requirement at each Interface Point will essentially ensure that the STU may determine the corrective measures to be taken to maintain the capacity adequacy in the Transmission System up to the

Interface Point. This will facilitate the Transmission Licensee to develop the compatible Transmission System.

- (7) The licensee shall create a database of loads for each consumer category and for each distribution substation and update it annually.

3.5 Power System Studies and Network expansion Plan

- (1) Based on the projected load, the Distribution Licensee shall carry out the power system studies (load flow analysis) before undertaking major distribution expansion plan on long term time scale.
- (2) The Licensee shall employ the software tools for distribution network analysis for:
 - (a) Optimum distribution transformer locations
 - (b) Optimum network of sub-transmission system, primary distribution, LT feeders and substation location.
 - (c) Optimum ratio of the lengths of HT and LT distribution lines
 - (d) Optimum reactive compensation

3.6 Security Standards

The Distribution System shall be planned and maintained so as to fulfil the following security standards except under Force Majeure conditions beyond the reasonable control of the Distribution Licensee.

- (1) The feeders, either HT or LT, feeding important loads such as hospitals, crematoria, airports, railway stations, and the like shall be planned to have a selective switching system, so that selective switching can be operated to transfer the load on to an alternate healthy feeder. Appropriate safety precautions shall invariably be taken in this regard. In case of failure of the feeder, these switches shall be operated immediately either manually or automatically depending on the importance of the load.
- (2) The rupturing capacity of the switchgear employed in the system shall have at least 25% more capacity than the short circuit level computed even considering the anticipated future development of the system.

- (3) Efforts shall be made for every HT feeder, either primary or secondary, to manually switch over to the immediately available HT feeder of the same voltage class available in the vicinity. Provision shall be made in the design itself for all critical HT feeders to share at least 50% of the loads in the adjacent feeder during emergencies. The same shall be extended to all the HT feeders in a phased manner.
- (4) In case of single contingency; failure of any substation equipment controlling any outgoing 11 kV or 33 kV feeders, the load interrupted shall not generally exceed 50% of the total demand on the substation. The Distribution Licensee has to bring it down to 20% within a period of three years. It will not be applicable to the remote inaccessible and snowbound area.

3.7 System adequacy and Redundancy

- (1) The Distribution Licensee while planning Distribution System shall take into consideration the adequacy and redundancy of system capacity and capability to allow for long term load growth based on perspective plan and maintaining supply to consumers in the event of forced or planned outage of lines and transformers. The system shall have built in redundancy so that consumers face no interruption in power supply through alternative circuit arrangements.
- (2) Sub-station design shall allow taking out any transformer for maintenance without affecting supply to any area even during peak hours. More than one transformer with smaller capacity to be employed rather than one transformer of large capacity to meet N-1 planning criteria. Alternative circuits shall be planned for important loads. So far as possible, redundancy should be in the system to meet the emergencies and system adequacies shall be taken care of at planning stage of new sub-station(s).

3.8 Energy Audit

- (1) The Distribution Licensee shall establish and maintain a system for segregation of technical and commercial losses through energy audits.

Interface meters capable of data retaining capacity of at least 65 days shall be installed for all the incoming/outgoing feeders for each such unit.

- (2) The energy audit for total system shall be carried out by compiling the data and analysis carried out in each responsibility centre. The energy received from each substation shall be measured at the 11 kV / 33kV terminal switchgear of all the outgoing feeders installed with appropriate energy meters such that the energy supplied to the each feeder is accurately available. It shall be compared with the corresponding figures of monthly energy sales and the distribution loss for each feeder shall be worked out. In case the Distribution Licensee has adopted ring main system at 11 kV and 33 kV and there is difficulty in determining the distribution losses for each feeder, then the Distribution Licensee shall work out distribution losses for the overall Area of Supply.
- (3) An action plan for reduction of the losses with adequate investments and suitable improvements in governance should be drawn up and shall be submitted to the Commission annually along with Annual Revenue Requirement Filing.

3.9 Database Management

- (1) The availability of accurate and reliable data is essential for planning and development of the Distribution System on long-term basis. Data management system facilitates storage, retrieval and updating of data for complying with the requirements of the Distribution Code and for other purposes like power system studies.
- (2) The embedded generators connected with distribution system or seeking new connections shall furnish planning data in format specified at Annexure-2. The large consumers connected to or seeking connection to HT or EHT and having connected load of 1 MVA or above shall furnish planning data in prescribed manner as at Annexure-1 for long term planning by Distribution Licensee. Distribution Licensee shall supply system data to the Users, embedded generators and large consumers, wherever required for their planning purpose as per format at Annexure-3.

- (3) A well maintained Data Management System would facilitate exchange of data between Users and Distribution Licensee required for long-term planning and distribution operation in an accurate and reliable manner. This will also help in Users, Large Consumers, open access customers and embedded generators to have access to data, which they may require for their planning purpose.

3.10 Standing Committee for Design, Construction and Maintenances Practices

- (1) Standing Committee consisting of following members shall be constituted by the Distribution Licensee within one month of notification of these Regulations:
 - (a) Technical Member of Distribution Licensee – Chairman of Standing Committee
 - (b) General Manager (Engineering / Planning) Distribution Licensee – Member
 - (c) General Manager (Contract & Procurement) Distribution Licensee – Member
 - (d) General Manager (Design & Planning) STU- Member
 - (e) One representative from Industrial Consumers- Member
 - (f) One representative from Domestic / Commercial Consumers- Member
 - (g) Any other person as Licensee may deemed appropriate- Member
- (2) The Standing Committee shall be an advisory body having perpetual term and shall hold its meeting at least once in each quarter. The Standing Committee shall suggest and make recommendations on matters amongst others in the following areas:
 - (a) To review and suggest the latest practices on design and technical specifications of line materials, meters and metering equipment, service line materials, sub-station equipments like transformers, circuit breakers, CT/PT sets etc.

- (b) To suggest vendor selection and short listing procedures for various equipments and materials being used in bulk
- (c) To suggest best industry practices for construction, operation, maintenance of 33kV, 11 kV and LT Lines, 33/ 11 kV Sub-stations, 11 kV Pole mounted and other ground mounted sub-stations etc.
- (d) To recommend and suggest latest technology up gradation and process such as IT tools and SCADA and other Control System
- (e) To recommend embargo and restrictions on dangerous, unhygienic practices and material from point of view of safety, environmental up-keep and pollution norms.

3.11 Standardisation of Nomenclatures & Identification Coding

The Distribution Licensee shall prepare equipment nomenclatures and identification equipments for uniquely identifying various equipments in distribution system. The nomenclatures scheme shall be consistent with the scheme provided in the UERC (State Grid Code) Regulations, 2007 for the intra State Transmission System.

3.12 Reactive compensation

- (1) Shunt capacitors un-switched/switched type, shall be installed at the appropriate places in the Distribution System for minimising reactive power drawl from the grid, power factor improvement, maintaining satisfactory voltage profile and reduction of sub-transmission and Distribution losses. The size and location of the capacitor installations shall be determined using appropriate computer software, with reliable field data. Suitable precautionary measures, such as automatic switching etc., shall be adopted to avoid over voltages during light load periods.
- (2) Optimisation studies of shunt compensation shall be conducted by the Distribution Licensee to determine the most appropriate sizes and locations for shunt capacitor installations.

3.13 Metering

- (1) All interface meters, consumer meters and energy accounting and audit meters shall be installed and operated in conformance with the Central Electricity Authority (Installation & Operation of Meters) Regulations 2006.
- (2) The metering for 230 V single-phase supply shall be provided on a board or within a suitable box located in such a place protected from sun and rain and shall be in a convenient position for taking readings. The terminals of the meter shall be made tamper-proof and sealed. For 400 Volts three phase supply, the meters and associated metering equipment including connections shall be enclosed in a suitable tamper-proof box. The tamper-proof box shall be of sufficient strength and design with locking and sealing devices and shall have adequate provision for heat dissipation with the required electrical clearances. The design shall permit readings to be taken without access to its connections.
- (3) For HT Consumers the meters, maximum demand indicators shall be housed in a separate metering compartment and secondary apparatus such as instrument transformers and connections required shall be housed in a separate compartment, which shall be locked / sealed to prevent tampering.
- (4) The HT metering cubicle shall be suitable for cable entry on both sides or at least on one side. No fuses are permitted in the secondary circuits of the instrument transformers. The metering cubicle shall be painted with suitable epoxy paint for installation in snow bound areas and other areas experiencing heavy rainfall. The instrument transformers shall be of fixed ratio and shall not have any taps. The primary current rating of the current transformers shall match with the normal full load current and the saturation point of the core shall be higher than the maximum current that may occur due to simultaneous full load operation of all the connected equipment and machinery.

- (5) For HT and EHT Consumers, the secondary terminals of the instrument transformers shall be locked and sealed and the secondary wires brought out in a suitable GI conduit pipe up to the metering panel. There shall be no joints in the conduit pipes. The meters shall be as close to the instrument transformers as possible and in no case shall exceed ten (10) meters. The metering panel shall be housed in a weatherproof and tamperproof box and sealed.

CHAPTER 4: CONNECTIVITY CONDITIONS

4.1 Objectives

- (1) The Connectivity Conditions specify the minimum technical and design criteria, which shall be complied by any agency connected to, or seeking connection to the Distribution System. The Distribution Licensee shall ensure compliance of the above criteria by any agency as a pre-requisite for the establishment of an agreed connection. The connectivity conditions should fulfil the requirement stipulated in section 50 and 53 of the Act.
- (2) The Connectivity Conditions are provided to ensure that:
 - (a) The basic rules for connections are complied by all agencies. This will help to treat all agencies in a non-discriminatory manner.
 - (b) Any new or modified connection, when established, shall not suffer unacceptable effects due to its connection to the Distribution System nor produce unacceptable effects on the system or any other connected agency.
 - (c) The ownership and responsibility for all the equipments, in case of interface / connections with all Users at HT and EHT, shall be clearly specified in a Site Responsibility Schedule as per Format specified in Annexure-4 for every site, where a connection is made.

4.2 Interface Point

- (1) Connection to Transmission System shall be governed by the UERC (State Grid Code) Regulations, 2007.
- (2) Connection of Small Generators (not below 1 MVA) to Distribution Systems at Bus bars may be provided at the Generating station. All generating units shall inject the output into the bus bars via the synchronising breaker. The isolator between the synchronising breaker and the bus bars would be the boundary between the Generator and the Distribution Licensee. The current transformers of the tariff metering shall

be connected near the synchronising breaker. The voltage transformers (including the standby set) of the tariff metering shall be connected to the bus-bars. However, the small generators based on non-conventional source of energy will be exempted and will be allowed for the connection with Distribution System / Transmission System as feasible.

- (3) EHT/HT Consumers: The supply voltage may be 220kV/ 132kV/ 66kV/33kV/ 11 kV or voltage as agreed by the Distribution Licensee. In respect of the substations owned by the Users, the boundary shall be the Distribution Licensee's cut off point/isolators. When any EHT/HT consumer is fed from a dedicated feeder the boundary point shall be the line isolator at the Sub-Station of the Distribution Licensee.
- (4) Low voltage Consumers: The incoming terminal of the cut out / circuit breaker installed by the Consumer is the boundary of low voltage Consumers. The tariff metering shall be provided before a fuse unit / circuit breaker of the Consumer. The metering equipment shall be provided at the entry point of Consumer Premises in a safe location, preferably at the entry of the boundary of the premises or in a common passage on ground floor or near by safe location outside the premises for easy access for the purpose of meter reading, maintenance, repairs, inspection, etc. The metering equipment shall be provided inside a box sealed by the Distribution Licensee and the User / Consumer shall not disturb the seal of the metering equipment and shall take reasonable care for protecting the meter and equipment.

4.3 Operational Labelling

- (1) The Licensee and the Users shall be responsible for the provision and maintenance of clear, unambiguous signs and labels indicating the numbering and / or name of the equipment / apparatus and circuit at the substations and connection sites.
- (2) The equipment installed shall conform its relevant I.S specification and the ratings and salient specification shall be maintained on the equipment's

nameplate. No electrical equipment shall be used without its manufacturers nameplate permanently affixed to it.

4.4 System Performance

- (1) The design and construction of all the equipments connected to the Distribution System shall satisfy the relevant Indian Standard Specifications to the maximum extent possible.
- (2) Installation of all electrical equipment shall comply with rules and code of practice in force.
- (3) For every new connection sought, the Distribution Licensee shall specify the Connection Point/ Interface Point and the supply voltage, along with the metering and protection requirements as specified in the code.
- (4) The operation of the Distribution System shall be in accordance with the "Distribution System Operating Standard". The User shall however be subject to the distribution discipline prescribed by the SLDC/ Sub LDC.
- (5) The insulation co-ordination of the Users' equipment shall conform to the applicable Indian Standards/Code of practices.

4.5 Procedure for Applications for connections to the System

Any User seeking use of Distribution System is required to submit application for connection to the Licensee as per the procedures and formats laid down in UERC (Release of new LT Connections, Enhancement and Reduction of Loads) Regulations, 2007.

4.6 Connection Agreement

A connection Agreement between User and the Distribution Licensee shall be executed both for sale and purchase including Independent Power Producer (IPP). Separate agreement for generation shall be prescribed.

CHAPTER 5: OPERATION CODE

5.1 Introduction

This chapter contains the procedures and practices to be followed for safe and efficient operation of the Distribution System by the Licensee and Users. The following aspects of operation are covered in this section:

- (1) Demand Estimation
- (2) Outage Planning
- (3) Contingency Planning
- (4) Demand Side Management and Load Shedding
- (5) Interface with Small Generating Plant including CPPs
- (6) Monitoring and Control of voltage, and power factor
- (7) Safety Co-ordination
- (8) Communication
- (9) Maintenance and testing
- (10) Tools and spares
- (11) Training

5.2 Demand Estimation

- (1) The Distribution Licensee shall estimate hourly and daily Demand for his Area of Supply on the basis of relevant load curves drawn on day ahead basis subject to modifications depending upon the communication received from any specific User or caused by any contingency. This may be given to SLDC as may be required.
- (2) For this purpose, the concerned major Users identified by the Distribution Licensee shall furnish the required data pertaining to their demands of their installation to him.

5.3 Outage Planning

- (1) The Distribution Licensee shall furnish his proposed outage programs to the Transmission Licensee on a month ahead basis. The outage program

shall contain identification of lines and equipment of the Distribution System proposed by Licensee.

- (2) The outage plan proposed by the Licensee shall come into effect only after the Transmission Licensee releases the finally agreed transmission outage plan.
- (3) However at the time the line or equipment is taken out of service, the Distribution Licensee shall intimate the Transmission Licensee to facilitate in accommodating their maintenance work, if possible, even though the same is already included in the approved plan.
- (4) In case of lines and equipment of 66 kV and above the specific concurrence of SLDC shall be obtained in addition to the above.
- (5) The above procedure shall not apply under the following circumstances:
 - (a) Emergency situations' to save plant and machinery;
 - (b) In such of the unforeseen emergency situations requiring isolation of lines or equipment to save human life,
 - (c) Where disconnection is to be effected on any User installation due to breach of Agreement. In this case the SLDC shall be informed wherever the load to the extent of 1 MVA or more is affected.
- (6) Planned outages of Power System for the duration as specified in UERC (Standards of Performance) Regulations, 2007 for Licensee for maintenance purposes shall be intimated to the public through media including publishing in at least two largely circulated Newspapers in Uttarakhand (one in Hindi and one in English) of that area, two days in advance.

5.4 Contingency Planning & Crisis Management

- (1) A contingency situation may arise in the event of a total or partial blackout in the Transmission System. A contingency may also arise on a part of the Distribution System due to local breakdowns in the Distribution System itself. It may also arise due to a breakdown in the Apparatus of the Transmission Licensee at the point of interconnection.
- (2) Contingency and crises management procedure shall be documented unambiguously to achieve the restoration of the total system and

associated demand, and re-synchronization of parts of the total system, which have become out of synchronism with each other, at the shortest possible time.

(3) Transmission System Failure:

- (a) In case of a total blackout at any point in the Area of Supply of Distribution Licensee, the Distribution Licensee shall follow the black start procedures framed by the Transmission Licensee.
- (b) The Distribution Licensee shall sectionalize the Distribution System into discrete blocks of demand. The Licensee shall advise and cooperate with the SLDC for the amount of MW load likely to be picked up on switching each demand block.
- (c) The Distribution Licensee shall prepare a schedule of essential and non-essential loads in order of priority at each connection to be picked up during the restoration process.
- (d) The Distribution Licensee shall maintain direct communication links with the SLDC and shall ensure and maintain the load generation balance under the direction of the SLDC.
- (e) The Distribution Licensee shall furnish the names and designations of the person(s) with their telephone numbers and stations, authorised to deal with contingency operations, to the SLDC.

(4) Failure of the Apparatus of the Transmission Licensee:

- (a) The Distribution Licensee shall immediately contact the authorised person at the substation of the Transmission Licensee, and assess the probable period of restoration and the probable restriction of load drawl from the affected substation.
- (b) The Distribution Licensee shall affect the demand management plan accordingly.

(5) Distribution System Failure:

- (a) Interruptions to power supply in any part of the Distribution System lasting for the period as specified in UERC (Standards of Performance) Regulations, 2007 for Licensee due to breakdown in

any part of the Distribution System may be termed as a Distribution System Failure.

- (b) The Distribution Licensee shall coordinate with SLDC for restoration process, which shall be as per UERC (State Grid Code) Regulations, 2007.
- (c) The Distribution Licensee shall designate a Nodal officer to coordinate with SLDC for distribution system restoration.

5.5 Demand management and load shedding

- (1) Temporary Load Shedding may be resorted to for maintaining the grid frequency as instructed by the SLDC. Temporary Load Shedding may also be necessitated due to loss of any circuit or equipment or any other operational contingency. In case of automatic load shedding through Under Frequency Relays, the circuits and the amount of load to be interrupted with corresponding relay settings shall be co-ordinated with the SLDC and persons in charge of the substations of the Distribution Licensee as necessary.
- (2) In the event of sustained shortages, Distribution licensee shall submit a detailed program for planned load shedding indicating areas and timing of proposed load shedding for approval. On receiving Commission's approval, Licensee shall publish the approved program in atleast two local newspapers. Licensee shall seek fresh approval from Commission for any deviation from approved load shedding program.
- (3) If the duration of unplanned load shedding to any part of the Distribution System exceeds 2 hours, the affected Consumers on independent circuits, emanating from primary sub-stations may be suitably intimated. The essential services such as public hospital, public water works, sewage works, etc. shall be intimated over the telephone wherever possible.
- (4) Dedicated feed ers for supply of power to agriculture consumers shall be constructed so as to ensure 8 to 10 hours supply on such feeders.
- (5) As far as possible, 33 KV ring mains shall be provided in big towns.

5.6 Interface with Small Generating Units including Captive Power Plant (CPP)

- (1) If the Distribution Licensee has an interface with any generating unit including CPP and an Agreement for this purpose exists, the Distribution Licensee and the concerned owner of the generating unit shall abide by the following provisions in addition to the provisions contained in this Code as applicable to all the Users:
 - (a) The owner shall provide suitable protection at the interface to protect his system from any damage due to normal and abnormal conditions in the Distribution System.
 - (b) If the generator is an induction generator, the owner shall take adequate precautions to limit the system disturbances, when the induction generator is synchronised in consent with the Distribution Licensee. Generating Company having induction generators shall install adequate capacitors to compensate the reactive power drawl. Also whenever the power factor is found very low during starting period and causes voltage dip in the Licensee's system the Licensee may advise the owner to install capacitors and the generating company shall comply. Failure to comply entails penalty and/or disconnection from the system as per provision of Rules and Acts.
- (2) The owner shall comply with the provisions of the UERC (State Grid Code) Regulations, 2007.

5.7 Monitoring and Control of Voltage and Power Factor

- (1) The Distribution Licensee shall monitor the voltage and power factors in the Distribution System at system input points at peak and off-peak hours and take reasonable measures for improvement of the same in coordination with the Users with demand of 1 MVA and above, and the Transmission Licensee.

- (2) The Distribution Licensee shall take power factor improvement measures at strategic points in the Distribution System by carrying out system studies and installing the required reactive compensation equipment.
- (3) Users having loads with low Power Factor shall install capacitors of appropriate rating as per Annexure-5. The consumers using power for welding purposes shall install the equipment as specified by licensee from time to time, to prevent frequent voltage fluctuations.
- (4) The Distribution Licensee shall abide by the instructions issued by the SLDC from time to time on load management for maintaining the frequency of supply within the specified limits.

5.8 Safety co-ordination

- (1) The Distribution Licensee and the Users (comprising Generating Companies, Transmission Licensee and Consumers having load above 1MVA or dedicated lines) and any other Distribution Licensee having common electrical interface with the Licensee shall designate suitable persons to be responsible for safety co-ordination. These persons shall be referred to as Safety and Control Persons. Their designations and telephone numbers shall be exchanged between all the concerned persons. Any change in the list shall be notified promptly to all the concerned.
- (2) The Distribution Licensee and Users shall prepare safety manuals incorporating all the safety precautions to be taken for each component of the Distribution System based on the Distribution System under Safety Code issued separately. All the safety rules and precautions shall be observed when work is to be carried out on any line or apparatus, switchgear or circuits in any part of the Distribution System or in any part of the User System. The safety code thus prepared shall be issued to all the Safety and Control persons and such Users for compliance.
- (3) There shall be co-ordination between persons of the Distribution Licensee and the Users, between persons of two Distribution Licensees having electrical interfaces, for carrying out the work on any apparatus or lines etc., belonging to either party at the point of interconnection.

- (4) The provisions of the UERC (State Grid Code) Regulations, 2007 shall be followed at Connection Points/ Interface Points in co-ordination with the Transmission Licensee.
- (5) The disconnecting device(s) at each electrical interface, which shall be capable of effectively disconnecting the system of the Distribution Licensee and the other Users, and the grounding devices of the respective systems at the control boundary shall be identified and marked by the Licensee and the respective Users. These shall be maintained in good condition at all times. To prevent inadvertent switching operations by unauthorised persons, such disconnecting devices shall be provided with interlocks.
- (6) Wherever any Consumer has installed an emergency power supply system, either an electronic system with storage batteries or with generators, the arrangement shall be such that the same cannot be operated without clearly isolating the system from the supply mains. The responsibility of making the required arrangement for isolation from supply mains shall be of the User and this shall be part of the electrical layout submitted to Electrical Inspector for his approval. A copy of the approved layout shall be provided to Distribution Licensee thereafter. The possibility of a feed back from these devices to the Distribution System from any of the conductors, including the neutral conductor shall be clearly ruled out.
- (7) The appropriate Control Person at the electrical interface shall issue written permission to his counterpart for carrying out the work on any apparatus, switchgear or lines beyond the electrical interface. Such permissions shall be termed as Permit to Work (PTW). The format for PTW shall be standardised by the Distribution Licensee and shall be used by all concerned.
- (8) All maintenance work shall be duly authorised by the designated officer. The system of PTW shall be observed for carrying out any maintenance work. The line should not be energised back without return of PTW after completion of maintenance work.

- (9) The Distribution Licensee in consultation with the concerned User shall frame checklist of operations to be carried out and the procedures for safety coordination for each electrical interface, before issue and return of PTW. Such procedures and checklists shall be issued to all the concerned by the Licensee for implementation.

5.9 Operational Communication

- (1) Reliable communication such as telephones, emails etc. links shall be established for exchange of data, information and operating instructions between SLDC and the Distribution licensee, embedded generators, users and large consumers with a Demand of more than 1 MVA.
- (2) The Distribution Licensee and the Users connected to its Distribution System shall designate officers and agree on communication channels for the exchange of information. Communication shall, as much as possible, be direct between the User and the operator of the Distribution System to which that User is connected.
- (3) List of telephone numbers, call signs and e-mail IDs shall be exchanged by the Distribution Licensee and concerned Users to enable control activities to be efficiently coordinated.

5.10 Mobile Breakdown Vans

The Distribution Licensee shall provide Mobile Breakdown Vans in important towns and cities for attending line and transformer faults and consumers' complaints without any delay. The Mobile Breakdown Vans will be equipped with all necessary Tools such as cable jointing kits and consumable at all times on duty. The Breakdown Vans shall be fitted with wireless phone, telescoping ladder. All spares necessary for maintenance work shall be provided in such breakdown van and inventory of spares shall be replenished from time to time.

5.11 Reserves and standbys

- (1) The Distribution Licensee shall maintain adequate reserves and standby emergency equipment for attending forced outage conditions of lines and

transformers. These include oil filtration sets, cable jointing and maintenance kits, mobile cranes, chain-pulley, lifter etc.

- (2) The Distribution Licensee at all time must have adequate spare transformers, isolators, circuit breakers, CTs - PTs, insulators, hardware, cable and cable boxes etc. for undertaking emergency.
- (3) The Distribution Licensee shall have minimum maintenance and live wire maintenance Gangs available at important locations which can be called and deployed on maintenance work of emergent nature.

5.12 Construction Practices

- (1) All electric supply lines and apparatus shall be of sufficient ratings for power, insulation and estimated fault current and of sufficient mechanical strength, for the duty which may be required to perform under the environmental conditions of installation, and shall be constructed, installed, protected, worked and maintained in such a manner as to ensure safety of human beings, animals and property.
- (2) The relevant code of practice of the Bureau of Indian Standards including National Electrical Code, if any may be followed. The material and apparatus used shall conform to the relevant specification of Bureau of Indian Standards where such specifications have been already laid.
- (3) The Licensee shall prepare and observe the Construction & Maintenance Manuals for various equipment/works like 33 kV Lines, 11 kV Lines, LT Lines, 33 kV sub-station and 11 kV sub-stations. The Construction & Maintenance Manual shall be prepared taking into consideration the following:
 - (a) Technical Standards for construction of electrical plants, electric lines and connectivity to the grid specified by the Central Electricity Authority under section 73(b) of the Electricity Act 2003;
 - (b) Safety requirements for construction, operation and maintenance of electrical plants and electric lines specified by the Central Electricity Authority under section 73(c) of the Electricity Act 2003;
 - (c) REC Construction Standards and Standard design layouts;

- (d) CBIP Publications on Code of Practices;
 - (e) Code of Practices issued by Bureau of Indian Standards for various equipment and maintenance practices; and
 - (f) Instruction Manuals for installation, operation and maintenance issued by standard equipments manufacturer concerned.
- (4) The standard tables for conductor size, fuse size, wire gauge, electrical clearance, ground wire size, insulation resistance and earth resistivity etc. shall be included in the Construction and Maintenance manual. Distribution Licensee shall ensure that its construction and maintenance staff strictly observe the norms given in the Manuals.

5.13 Preventive Maintenance Schedules

- (1) The Distribution Licensee shall prepare a Preventive Maintenance Schedule for various line and sub-station equipment installed in distribution system. The Preventive Maintenance Schedule shall include the following important equipment:
- (a) Power Transformers and Distribution Transformers installed outdoor/indoor ;
 - (b) 11 kV & 33 kV Circuit Breakers and associated equipments;
 - (c) 11 kV & 33 kV Overhead lines including General Order (G.O.) Switches & Drop Out Fuses;
 - (d) 11 kV & 33 kV Cable & Cable Boxes;
 - (e) LT Lines & circuit breakers; and
 - (f) Service Connection.
- (2) The Preventive Maintenance Schedule shall have sections covering the following:
- (a) Recommended Schedule for inspection;
 - (b) Recommended Schedule for preventive maintenance; and
 - (c) Recommended Schedule for overhaul.
- (3) The inspection schedule and preventive maintenance schedule shall have daily, weekly, monthly quarterly and annual periodic activity to be carried out for various equipments.

5.14 Maintenance Records

- (1) The Distribution Licensee shall maintain records of periodic inspections carried out in the standard formats prescribed in Preventive Maintenance Schedule. Records shall be maintained in respect of following amongst others:
 - (a) Power Transformers and Distribution Transformers installed indoor/outdoor
 - (b) 11 kV & 33 kV Circuit Breakers;
 - (c) 33 kV & 11 kV Lines
- (2) Regular testing of all the equipments such as transformers, switchgear, protective relays, etc., should be carried out as recommended by the manufacturer and the relevant code of practice issued by the Bureau of Indian Standards and CBIP. These shall be carried out at the prescribed intervals and the test results shall be recorded in the maintenance registers. Wherever the test results indicate a decline in the insulation resistance and/or deterioration of the equipment, preventive maintenance shall be carried out to ensure serviceability, safety and efficiency. Presently maintenance and testing schedule shall be adopted as per the REC manual.
- (3) The consumers shall maintain their apparatus and power lines at all times conforming to I.E. Rules, 1956 and these shall be suitable for connection to distribution system in a safe and reliable manner.

5.15 Environmental Issues

- (1) The Distribution Licensee shall take due regards of environment regulatory guidelines in planning, design, construction and operation of distribution system. Environmental impact assessment shall be carried out for all major distribution projects like construction of sub-stations in green and reserved area. The required clearances and no-objection shall be obtained from State Pollution Control Boards wherever prescribed.
- (2) The Distribution Licensee shall ensure that the environmental concerns would be suitably addressed through appropriate advance action by way

of comprehensive Environmental Impact Assessment and implementation of Environment Action Plan (EAP)

5.16 Energy Conservation

- (1) The Distribution Licensee in order to minimize the overall requirement, energy conservation and demand side management (DSM) shall accord high priority. The Distribution Licensee shall ensure compliance of the Energy Conservation Act and adhere to the guidelines of Bureau of Energy Efficiency in this regards.
- (2) Distribution Licensee shall ensure that the periodic energy audits wherever have been made compulsory for power intensive industries, under the Energy Conservation Act, being complied by its consumers. Other industrial consumers may also be encouraged to adopt energy audits and energy conservation measures. Energy conservation measures shall be adopted in all Government buildings for which saving potential has been estimated to be about 30% energy. Solar water heating systems and solar passive architecture can contribute significantly to this effort.
- (3) The Distribution Licensee in the agriculture sector shall promote the pump sets and the water delivery system engineered for high efficiency. In the industrial sector, The Distribution Licensee shall take action for promoting energy efficient technologies as energy conservation measures. Motors and drive system are the major source of high consumption in Agricultural and Industrial Sector. The Distribution Licensee shall advise that the consumers use high efficiency motors in Agricultural and Industrial Sector. Distribution Licensee shall take effective steps such that energy efficient lighting technologies should also be adopted in industries, commercial and domestic establishments.
- (4) Distribution Licensee shall endeavour that the requirements for capacity additions is reduced to the extent possible by reducing the difference between electrical power demand during peak periods and off-peak

periods through suitable load management techniques such as differential tariff structure for peak and off peak supply and metering arrangements (Time of Day metering) to achieve an efficient load management.

5.17 Tools and Spares

- (1) The Distribution Licensee shall ensure availability of proper tools and tackles at all work places for carrying out the maintenance. The tools and tackles shall be checked from time to time and their serviceability shall be ensured.
- (2) The Distribution Licensee shall maintain an inventory of spares required for maintenance and replacement purposes at suitable locations according to a clear policy to be laid down by the Licensee.

5.18 Human Resource Development and Training

The Distribution Licensee shall impart necessary training to its officers/staff in distribution system operation and maintenance practices so as to implement the provisions of this Regulation. The Distribution Licensee shall make appropriate arrangements for imparting training to workmen and supervisory staff, incorporating up-to-date techniques and safety measures of distribution system design, construction and maintenance.

5.19 Geographical Information System (GIS)/Global Position Satellite (GPS) based information system

The Distribution Licensee shall, in stages, deploy GIS/GPS based Geographical Facilities Information System for planning operation and maintenance of distribution system. The GIS shall be utilized for mapping the all important elements of distribution system which includes lines, transformers, sub-stations, generating stations, all unit locations and shall eventually covers all consumers . The GIS shall be linked to active relational database management system (RDBMS) and GPS shall be utilized for time synchronization.

CHAPTER 6: DISTRIBUTION PROTECTION REQUIREMENT

6.1 Introduction

In order to safeguard Distribution System and prevent faults travelling into the Transmission System, it is essential that certain minimum standards for protection shall be specified for the Distribution Licensee and Users connected to Distribution System. This chapter describes these minimum standards.

6.2 Objective

The objective of this chapter is to define the minimum protection requirements for any equipment connected to the Distribution System, so that faulty distribution section can be isolated from rest of power system and thereby minimize disruption due to faults.

6.3 General Principles

- (1) No item of electrical equipment shall be allowed to remain connected to the distribution system unless it is covered by appropriate protection aimed at reliability, selectivity, speed and sensitivity of protective relays/devices. Distribution Licensee and users shall co-operate with Transmission Licensee to ensure correct and appropriate settings of protection to achieve effective, discriminatory removal of faulty equipment within the target clearance time specified in the UERC (State Grid Code) Regulations, 2007.
- (2) Protective relay settings shall not be altered or protection bypassed and/or disconnected without consultation with concerned distribution licensee. In case the protection has been bypassed and/or disconnected by mutual consent, the same should be rectified and protection restored to normal condition as quickly as possible. If no consensus is reached, all the electrical equipments shall be isolated forthwith.

6.4 Protection Manual

Distribution Licensee shall prepare and enforce standard manual of protection indicating minimum protection requirement within the distribution system and connected Users' system. The Protection Manual shall cover protection of supply lines and Power and Distribution Transformers through which supply is provided to the consumers. The Protection Manual shall be prepared taking into consideration the UERC (State Grid Code) Regulations, 2007 and shall contain relevant data on fault levels at various places, guidelines for setting standard relays for over current and earth faults, fuse rating selection criteria etc. A copy of Protection Manual shall be furnished to Commission in compliance of this requirement after the same is prepared by the licensee.

6.5 Protection at inter-connection point of EHT GSS

All 33 kV and 11 kV lines emanating from EHT GSS shall be provided with a minimum of over current and earth fault protection with or without directional features along with high set element as per the UERC(State Grid Code)Regulations,2007 requirement. Co-ordination with the originating EHT sub-station should be ensured to avoid major sub-station equipment / EHT transmission lines from tripping on through faults due to delayed fault clearance in the distribution feeders. Protection on 33 kV & 11 kV transformers and lines (or their sectionalising points) of HT system of Distribution Licensee shall be coordinated with settings of protection provided on 33 kV & 11 kV feeders at EHT sub-stations.

6.6 33 kV and 11 kV line protection

- (1) The settings of protective relays for 33 kV and 11 kV lines from the feeding sub-stations shall be such that a fault in any section does not affect the upstream section between the generating unit/feeding substation and the faulty section under all conditions. 33 kV radial lines shall have two over current and one earth fault non-directional IDMT relay protection at feeding station. The relays shall also have instantaneous over current element. Where 33 kV line is an interconnection between two substations

or a generator unit and the substation, these relays shall have directional feature.

- (2) All 33 kV and 11 kV lines at connection points shall be provided with a minimum of over current and earth fault relays as follows:

| | | |
|---|---|--|
| 1 | Radial feeders | Non-directional time lag over current and earth fault relays with suitable settings to obtain discrimination between adjacent relays settings. |
| 2 | Parallel/ring feeders and inter-connected feeders | Directional time lag over current and earth fault relays. |
| 3 | Long feeders/transformer feeders | These feeders shall incorporate a high set instantaneous element. |

6.7 Transformer Protection

The Minimum protection requirements of transformers installed in distribution system shall be as under:

(1) 33/11 KV TRANSFORMERS

(a) On primary side:

(i) On primary side of transformers a link switch of such capacity as to carry the full load current and to break only the magnetising current of transformer provided the capacity of the transformer does not exceed 1500 kVA.

(ii) Circuit breaker, of adequate capacity, to be provided for transformers having capacity above 1500 kVA.

(b) On secondary side:

Circuit breaker of adequate capacity to be provided for all transformers.

(c) Buchholz, winding and oil temperature alarm protection shall be provided in transformers up to 1500 kVA. Both alarm & tripping protection shall be provided on transformers above 1500 kVA.

(d) Transformers of capacity above 5 MVA shall be protected against incipient faults by differential protection.

(2) 11/0.4 KV DISTRIBUTION TRANSFORMERS

(a) On primary side:

(i) On primary side of transformers a link switch of such capacity as to carry the full load current and to break only the magnetising current of transformer shall be provided.

(b) On secondary side:

(ii) All the transformers of capacity 250 kVA and above shall have circuit breaker of adequate rating.

(iii) In respect of transformers of capacity less than 250 kVA a link switch with fuse or circuit breaker of adequate rating shall be provided.

6.8 Protection Coordination

(1) The Distribution licensee shall decide the relay settings with the data collected from the Transmission licensee and the Users on Fault Levels at various EHT Sub-Stations. Representatives of the generating companies, transmission licensees and distribution licensees shall meet periodically to discuss such malfunctions, changes in the system configuration, if any, and possible revised settings of relays. The Transmission licensee shall notify the initial settings and any subsequent changes to the Distribution Licensee and Users from time to time. Routine checks on the performance of protective relays shall be conducted and any malfunction shall be noted and corrected as soon as possible.

(2) Transmission Licensee shall be responsible for arranging periodical meetings between the generating companies, transmission licensee and the distribution licensees to discuss coordination of protection as per the UERC (State Grid Code) Regulations, 2007 requirement. The transmission licensee shall investigate any malfunction of protection or other unsatisfactory protection issues. The distribution licensees shall take prompt action to correct any protection malfunction or activity in distribution system as discussed and agreed to in these periodical meetings.

CHAPTER 7: CROSS BOUNDARY SAFETY CODE

7.1 Introduction

This chapter specifies the requirements for safe working practices for maintenance of equipment associated with cross boundary operations and lays down the procedure to be followed when the work is carried out on electrical equipment connected to another User's System.

7.2 Objective

The objective of this section is to achieve an agreement on the principles of safety when working across a control boundary between the Distribution Licensee and the Users.

7.3 Control Persons and their Responsibility

- (1) The Distribution Licensee and all the Users (comprising Generating Companies, Transmission Licensees and consumers having load above 1 MVA or dedicated line) shall nominate suitably authorised and technically qualified persons to be responsible for the co-ordination of safety across their boundary. These persons shall be referred to as "Control Persons".
- (2) The Distribution Licensee shall issue a list of Control Persons with their names, designations, addresses and telephone numbers, to all the Users having direct control boundary with him. This list shall be updated promptly whenever there is any change of name, designation or telephone number of any Control Person named in the list.
- (3) All the Users having a direct control boundary with the Distribution Licensee shall issue a similar list of their Control Persons to the Licensee. This list shall be updated promptly whenever there is any change of name, designation or telephone number of any Control Person named in the list.
- (4) Whenever any work across a cross boundary is to be carried out by the User or the Distribution Licensee, the Control Person of the User or the Licensee as the case may be, who has to carryout the work, shall directly

contact his counterpart. Code words shall be agreed to at the time of work to ensure correct identification of both the parties. Contact between Control Persons shall normally be made by direct telephone.

- (5) If the work extends beyond one shift, the Control Person shall hand over charge to the relief Control Person and fully brief him on the nature of work and the code words in the operation.
- (6) The Control Persons shall co-operate to establish and maintain the precautions necessary to be taken for carrying out the required work in a safe manner. Both the established isolation and the established earth shall be kept in the locked positions wherever such facilities exist, and these shall be clearly identified.
- (7) The Control Person in charge of the work shall satisfy himself that all the safety precautions to be taken are established before commencing the work. He should issue the safety documentation to the working party to allow the work to commence.
- (8) After the completion of the work, the Control Person in charge of the work being carried out should satisfy himself that the safety precautions taken are no longer required, and shall make a direct contact with his counterpart Control Person and request removal of the safety precautions. The equipment shall be declared as suitable for return to service only after confirmation of removal of all the safety precautions, by direct communication, using the code word contact between the two Control Persons, and the return of agreed safety documentation from the working party.
- (9) The Distribution Licensee shall develop an agreed written procedure for Cross Boundary Safety and continuously update the same.
- (10) Any dispute concerning Cross Boundary Safety shall be resolved at the level of STU, if STU is not a party. In case where STU is a party, the dispute shall be referred to the Commission for resolution of the dispute.

7.4 Special Considerations

- (1) All the equipment on Cross Boundary Circuits, which may be used for the purpose of safety co-ordination and establishment of isolation and earthing, shall be permanently and clearly marked with an identification number or name being unique to the particular sub-station. These equipments shall be regularly inspected and maintained in accordance with the manufacturer's specifications.
- (2) Each Control Person shall maintain a legibly written safety log, in chronological order, of all operations and messages relating to the safety co-ordination sent and received by him. All these safety logs shall be retained for a period of not less than five years.
- (3) As far as possible each of the Distribution Licensee shall maintain an updated map of his system pertaining to the area fed by each substation. Otherwise the schematic diagram of the system for 11 kV and above shall be maintained and exhibited in the concerned area offices / feeding substations of the Distribution Licensee.

CHAPTER 8: INCIDENT / ACCIDENT REPORTING

8.1 Introduction

This chapter covers procedure of major incident / accident reporting (which occur in Distribution System) by Users to Licensee and Licensee to Chief Electrical Inspector.

8.2 Major Incident or Accident Reporting

- (1) The Users shall furnish information to the Licensee regarding any major incident occurring in their system promptly. The Distribution Licensee and the Users shall establish a format and procedure for exchange of information.
- (2) Reporting of accidents shall be in accordance with Rule 44-A of IE Rules, 1956, read with Sec. 161 of the Electricity Act, 2003. If an accident occurs in the distribution system resulting in or likely to have resulted in loss or injury to human or animal life, the Licensee shall send a telephonic report to the Electrical Inspector within 24 hours of the knowledge of such occurrence. This shall be followed by a report in writing in the form given in Annexure 6 (as per annexure xiii/rule 44A of Indian Electricity Rules, 1956), within 48 hours of the knowledge of occurrence of fatal and other accidents.

8.3 Reporting Procedure

- (1) All reportable incidents occurring in the lines and substations in distribution system shall be promptly reported orally by the Licensee whose equipment has experienced the incident, to all other significantly affected Users identified by the Distribution Licensee and the Transmission Licensee. The reporting Distribution Licensee should submit a written report to the Transmission Licensee, in a prescribed format mutually agreed by the Distribution and Transmission Licensee, within one hour of such oral report. If the reporting incident is of major nature, the written

report shall be submitted within six hours duly followed by a comprehensive report within 7 days of the submission of the initial written report. In other cases, the reporting Distribution Licensee shall submit a report within fifteen working days to the Transmission Licensee.

- (2) The Transmission Licensee shall call for a report from any Distribution Licensee on any reportable incident affecting other Users and particularly in case such User whose equipment might have been a source of the reportable incident does not report the same. However this shall not relieve any User from the obligation to report Events in accordance with Rules framed under relevant provision made under the Electricity Act, 2003. The format for such a report shall be as per the approval of the Distribution Code Review Panel and shall typically contain the following:
 - (a) Location of the incident,
 - (b) Date and time of the incident,
 - (c) Plant or Equipment involved,
 - (d) Supplies interrupted and the duration wherever applicable,
 - (e) Amount of Generation lost, wherever applicable,
 - (f) System Parameters before and after the incident, (Voltage, Frequency, Load, Generation, etc.)
 - (g) Network configuration before the incident,
 - (h) Relay indications and performance of protection,
 - (i) Brief description of the incident,
 - (j) Estimated time of return to service,
 - (k) Any other relevant information,
 - (l) Recommendations for future improvement,
 - (m) Name and designation of the reporting person.
- (3) The report shall contain sufficient detail to describe the event to enable the recipient to assess the implications and risks arising out of the same. The recipient may ask for clarifications and additional information wherever necessary and it is obligatory that the reporting User shall put his best efforts and provide all the necessary and reasonable information.

- (4) In case of a request by either party, the oral report shall be written down by the sender and dictated by way of a telephone message or sent by Fax/e-mail to the recipient. In case of an emergency the report can be given only orally and followed by written confirmation.
- (5) Reporting of accidents shall be in accordance with the rules framed under relevant provision made under Section 161 of the Electricity Act, 2003 and rules made there under. Till such time, rules under the Electricity Act, 2003 are framed by CEA, the Distribution Licensee shall follow reporting of accidents in the format given in Annexure 6.

By Order of the Commission

ANAND KUMAR
Secretary
Uttarakhand Electricity Regulatory Commission

Annexure -1

Load Data for demands of 1 MVA and above to be furnished by the User/Consumer

Name & Address of User/Consumer:

| S.No | Description | Details |
|-------------|--|---|
| 1 | Type of Load | (State whether: - steel melting furnace loads, Rolling mills, traction loads, other industrial loads, pumping loads, etc.) |
| 2 | Maximum Demand (kVA) and Annual Energy Requirement in kWh | |
| 3 | Year/Years by which full/part Supply is required | |
| 4 | Location of Load | (Furnish location map to scale, indicate details of Consumer category/capacity, nearest Railway Station, and nearest EHT sub-station) |
| 5 | Rated Voltage at which supply is required. Whether Single phase or Three-phase supply required | Normal/Alternate/Dedicated (specify details) |
| 6 | Type of supply | |
| 7 | Description of Equipment | |
| A | <u>Motors</u> State purpose and number of installations, voltage and kW rating, starting current, type of motors, types of drives and control arrangements | |
| B | <u>Heating</u> Type and kW Rating | |
| C | <u>Furnace</u> Type, Furnace Transformer Capacity and Voltage Ratio | |
| D | <u>Electrolysis</u> Purpose, kVA capacity | |
| E | <u>Lighting</u> kW Demand | |
| 8 | Sensitivity of demand to fluctuations in voltage and frequency of supply at the time of Peak Demand (Give details) | |

| S.No | Description | Details |
|-------------|--|-------------------------------|
| 9 | Voltage sensitivity | MW/KV MVA _r /Kv |
| 10 | Frequency sensitivity | MW/Hz MVA _r /Hz |
| 11 | Phase unbalance imposed on system Maximum (%) Average (%) | |
| 12 | Maximum harmonic component imposed (Furnish details of devices included with the system for the suppression of harmonics, also furnish the harmonic currents of different orders drawn by each device without filters) | |
| 13 | Details of any loads, which may cause Demand fluctuations of greater than 10 MW at the point of connection, including Voltage Dips (percentage) lasting for 5 seconds and more. (Give details) | |

Annexure -2**EMBEDDED GENERATOR UNIT-WISE DATA**

| | |
|---|--|
| Name & Address of Generating Company: | |
| Location of Generating Plants (s): | |
| Terminal Volts (kV); | |
| Rated kVA; | |
| Maximum and minimum Active Power sent out (kW) Reactive Power requirements (kVAr), if any; | |
| Type of Generating Plant—synchronous, asynchronous, etc.; | |
| Fault Level contribution | |
| Method of voltage control; | |
| Generator transformer details, if applicable; | |
| Requirements for Top-up supplies and/or standby supplies; | |
| Generator kW / kVAr capability chart (at lower voltage terminals); | |
| Type of excitation system; | |
| Inertia constant kW secs / kVA; | |
| Stator Resistance; | |
| Direct-Axis Reactance (Sub-transient, Transient & Synchronous); | |
| Quadrature-Axis Reactance (Sub-transient & Synchronous); | |
| Zero Sequence (Resistance & Reactance); | |
| Negative Sequence (Resistance & Reactance); | |
| Generator Transformer (Resistance, Reactance, kVA Rating, Tap Arrangement, Vector Group, Grounding, Connection & % Impedance); | |
| Automatic Voltage Regulator block diagram, including the data on the gains (forward and feedback), time constants, and voltage control limits; | |
| Speed Governor block diagram detailing the governor fly-ball, if applicable, and control system and Prime Mover time constants, together with the turbine rating and maximum power | |
| Standby Requirements: | |
| Rated Capacity and Minimum Generation of each Generating Unit and Power Station in kW for standby capacity requirements. | |
| Generating Unit and Power Station auxiliary Demand (Active Power and Reactive Power) in kW and kVAr, at rated capacity conditions. For Customers Self-Generating Plant, this shall include Top-up requirements. | |
| Interface Arrangements- the means of synchronization between the Distributors and User; | |
| Details of arrangements for connecting to ground that part of the Generator's System directly connected to the Distribution System; | |
| The means of connection and Disconnection which are to be employed | |
| Precautions to be taken to ensure the continuance of safe conditions should any grounded neutral point of the Generator's System become disconnected from ground. | |

Annexure -3

System Data to be provided to the intending User / Consumer with contract demand of 1 MVA or more (wherever applicable)

1. 33 KV and above Distribution Line Data relevant to the location where connection has been applied/feasible to provide.
2. Details of metering system and protection system proposed.
3. Fault levels at which the consumer should design his equipment.
4. Fault clearance time for consumer's switch gear and
5. Sub-station fault level.

Annexure -4

CONNECTION AGREEMENT

SITE RESPONSIBILITY SCHEDULE

Name of Sub-station / Location

Site Owner

Name of co-ordination officer of site

Telephone No.

Fax No.:

| 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 | | | | | | |
| Other (to be specified) | | | | | | |

| | Signatures |
|---|-------------------|
| Plant Owner | |
| Safety Responsibility Officer | |
| | |
| Control Responsibility Officer | |
| Operation Responsibility Officer | |
| Maintenance Responsibility Officer | |

Annexure –5**LIST OF POWER FACTOR APPARATUS****FOR MOTORS**

| S. No. | Rating of Individual Motor | KVAR Rating of Capacitor | | | |
|-----------|----------------------------|--------------------------|----------|----------|----------|
| | | 750 RPM | 1000 RPM | 1500 RPM | 3000 RPM |
| 1 | Upto 3 HP | 1 | 1 | 1 | 1 |
| 2 | 5 HP | 2 | 2 | 2 | 2 |
| 3 | 7.5 HP | 3 | 3 | 3 | 3 |
| 4 | 10 HP | 4 | 4 | 4 | 3 |
| 5 | 15 HP | 6 | 5 | 5 | 4 |
| 6 | 20 HP | 8 | 7 | 6 | 5 |
| 7 | 25 HP | 9 | 8 | 7 | 6 |
| 8 | 30 HP | 10 | 9 | 8 | 7 |
| 9 | 40 HP | 13 | 11 | 10 | 9 |
| 10 | 50 HP | 15 | 15 | 12 | 10 |
| 11 | 60 HP | 20 | 20 | 16 | 14 |
| 12 | 75 HP | 24 | 23 | 19 | 16 |
| 13 | 100 HP | 30 | 30 | 24 | 20 |
| 14 | 125 HP | 39 | 38 | 31 | 26 |
| 15 | 150 HP | 45 | 45 | 36 | 30 |
| 16 | 200 HP | 60 | 60 | 48 | 40 |

Annexure -5 (Continued)**LIST OF POWER FACTOR APPARATUS****FOR WELDING TRANSFORMERS**

| S. No. | Name Plate Rating in KVA of individual welding transformer | Capacity of the capacitors (KVAR) |
|---------------|---|--|
| 1 | 1 | 1 |
| 2 | 2 | 2 |
| 3 | 3 | 3 |
| 4 | 4 | 3 |
| 5 | 5 | 4 |
| 6 | 6 | 5 |
| 7 | 7 | 6 |
| 8 | 8 | 6 |
| 9 | 9 | 7 |
| 10 | 10 | 8 |
| 11 | 11 | 9 |
| 12 | 12 | 9 |
| 13 | 13 | 10 |
| 14 | 14 | 11 |
| 15 | 15 | 12 |
| 16 | 16 | 12 |
| 17 | 17 | 13 |
| 18 | 18 | 14 |
| 19 | 19 | 15 |
| 20 | 20 | 15 |
| 21 | 21 | 16 |
| 22 | 22 | 17 |
| 23 | 23 | 18 |
| 24 | 24 | 19 |
| 25 | 25 | 19 |
| 26 | 26 | 20 |
| 27 | 27 | 21 |
| 28 | 28 | 22 |
| 29 | 29 | 22 |
| 30 | 30 | 23 |
| 31 | 31 | 24 |
| 32 | 32 | 25 |
| 33 | 33 | 25 |
| 34 | 34 | 26 |
| 35 | 35 | 27 |

Annexure-6**The Indian Electricity Rules, 1956**

[Annexure xiii]

FORM FOR REPORTING ELECTRICAL ACCIDENTS**(See Rule 44-A)**

| | | | | | | |
|-------------------|--|----------------------|----------------------------|---------------------------------|--------------------------|--------------------------|
| 1 | Date and Time of accident | | | | | |
| 2 | Place of accident (Village / Town, Tehsil/Thana, District and State) | | | | | |
| 3 | System and voltage of supply (Whether EHT/HT/LT line, sub-station/generating station/consumer's installations/service lines/other installations) | | | | | |
| 4 | Designation of the Officer-in-charge (in whose jurisdiction the accident occurred) | | | | | |
| 5 | Name of owner/user of energy in whose premises the accident occurred. | | | | | |
| 6 | Details of victim(s) | | | | | |
| (a) Human | | | | | | |
| S.No. | Name | Father's Name | Sex of victim | Full Postal Address | Approx. Age | Fatal / Non-Fatal |
| | | | | | | |
| | | | | | | |
| (b) Animal | | | | | | |
| S.No. | Description of Animals | Number(s) | Name(s) of Owner(s) | Address (es) of owner(s) | Fatal / Non-Fatal | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 7 | In case the victim(s) is /are employee(s): (a) Designation of such person(s) (b) Brief description of the job undertaken, if any. (c) Whether such person/persons was/were allowed to work on the job. | | | | | |
| 8 | In case the victim(s) is/are employee(s) of a licensed contractor (a) Did the victim(s) possess any electric workman's permits(s), supervisor's certificate of competency issued under Rule 45? If yes give number and date of issue and the name of issuing authority. (b) Name and designation of the person who assigned the duties | | | | | |

| | | |
|-----------|--|--|
| | of the victim(s) | |
| 9 | In case of accident in the Distribution Licensee system, was the Permit To Work (PTW) taken? | |
| 10 | Describe fully the nature and extent of injuries, e.g. fatal /disablement (permanent or temporary) of any portion of the body or burns or other injuries. In case of fatal accident, was the post mortem performed? | |
| 11 | Detailed causes leading to the accident (To be given in a separate sheet annexed to this form) | |
| 12 | Action taken regarding first-aid, medical attendance etc. immediately after the occurrence of the accident (give details) | |
| 13 | Whether the District Magistrate and Police Station concerned have been notified of the accident (if so, give details) | |
| 14 | Steps taken to preserve the evidence in connection with accident to the extent possible. | |
| 15 | Names and designation(s) of the person(s) assisting, supervising the person(s) killed or injured. | |
| 16 | What safety equipments were given to and used by the person(s) who met with this accident (e.g. rubber gloves, rubber mats, safety belts and ladders etc.)? | |
| 17 | Whether isolating switches and other sectionalising devices were employed to deaden the section for working on the same? Whether working section was earthed at the site of work? | |
| 18 | Whether the work on live lines was undertaken by authorised person(s)? If so, the name and the designation of such person(s) may be given. | |
| 19 | Whether the artificial resuscitation treatment was given to the person(s) who met with the electrical accidents? If yes, how long was it continued before its abandonment? | |
| 20 | Names and designations of persons present at and witnessed the accident. | |
| 21 | Any other information remarks. | |

Place
Time
Date
Signature
Name
Designation
Address of the person reporting
