No. 12/X/STD(GRID)/GM/CEA - Whereas the draft of the Central Electricity Authority (Grid Standards) Regulations, 2006 was published, as required by Sub-section (3) of Section 177 of the Electricity Act, 2003 (36 of 2003), read with rule 3 of the Electricity (Procedure for Previous Publication) Rules, 2005;

Now, therefore, in exercise of the powers conferred by sub-section (2) of Section177 read with Section 34 and clause (d) of Section 73 of the Electricity Act, 2003, the Central Electricity Authority hereby makes the following regulations, namely:-

1. **Short Title, commencement and application.**-(1) These regulations may be called the Central Electricity Authority (Grid Standards) Regulations, 2010.

(2) Save as otherwise provided in these regulations, they shall come into force on the date of their publication in the Official Gazette,.

(3) These regulations shall apply to the Entities, Appropriate Load Despatch Centres, and, Regional Power Committees.

2. **Definitions**.- (1) In these regulations, unless the context otherwise requires,-

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

(b) "Appropriate Load Despatch Centre" means the National Load Despatch Centre, Regional Load Despatch Centre or State Load Despatch Centre or Area Load Despatch Centre as the case may be;

(c) "Area Load Despatch Centre" means the centre as established by the State Transmission Utility or licensee for load despatch and control in a particular area of the State;

(d) "Bulk consumer" means a consumer who avails supply at voltage of 33 kV or above;

(e) “condition based maintenance” means a set of maintenance actions based on continuous or frequent assessment of equipment condition, which is obtained from either of or a combination of embedded sensors, external tests and measurements;

(f) “disaster management” means the mitigation of the impact of a major breakdown on the system and bringing about restoration in the shortest possible time;

(g) “Emergency Restoration System” means a system comprising of transmission towers or structures of modular construction, complete with associated components such as insulators, hardware fittings, accessories, foundation plates, guys, anchors or installation tools and they like to facilitate quick restoration of damaged or failed transmission line towers or sections;

(h) ”Entity” means a Generating Company including captive generating plant or a transmission licensee including Central Transmission Utility and State Transmission Utility or a distribution licensee or a Bulk Consumer whose electrical plant is connected to the Grid at voltage level 33 kV and above;

(i) “grid disturbance” means tripping of one or more power system elements of the grid like a generator, transmission line, transformer, shunt reactor, series capacitor and Static VAR Compensator, resulting in total failure of supply at a sub-station or loss of integrity of the grid, at the level of transmission system at 220 kV and above (132 kV and above in the case of North-Eastern Region);

(j) “grid incident” means tripping of one or more power system elements of the grid like a generator, transmission line, transformer, shunt reactor, series capacitor and Static VAR Compensator, which requires re-scheduling of generation or load, without total loss of supply at a sub-station or loss of integrity of the grid at 220 kV and above (132 kV and above in the case of North-Eastern Region);

(k) ‘Schedule’ means schedule appended to these regulations;

(l) “time based maintenance” means inspection, cleaning and replacement of parts of the equipment based on a predetermined time schedule.

(m) ”transient stability” means the ability of the power system to maintain synchronism when subjected to a severe disturbance such as a short circuit on a transmission line;

(n) “voltage unbalance” means the ratio of the maximum voltage deviation of the phase voltage from the average phase voltage to the average phase voltage of the three phases;

(2) Words and expressions used and not defined in these regulations but defined in the Act shall have the meaning assigned to them in the Act.

3. Standards for Operation and Maintenance of Transmission Lines.- (1) All Entities, Appropriate Load Despatch Centres and Regional Power Committees, for the purpose of maintaining the Grid Standards for operation and maintenance of transmission lines, shall,-

(a) make all efforts to operate at a frequency close to 50 Hz and shall not allow it to go beyond the range 49.2 to 50.3 Hz or a narrower frequency band specified in the Grid Code, except during the transient period following tripping.

(b) maintain the steady state voltage within the limits specified below in Table 1:

Table 1

S. No.	Nominal System Voltage (kV rms)	Maximum (kV rms)	Minimum (kV rms)
1	765	800	728
2	400	420	380
3	220	245	198
4	132	145	122
5	110	121	99
6	66	72	60
7	33	36	30

(c) ensure that the temporary over voltage due to sudden load rejection remains within the limits specified in Table 2,-

Table 2

S. No.	Nominal System Voltage (kV rms)	Phase to Neutral Voltage (kV peak)
1	765	914
2	400	514
3	220	283
4	132	170

Provided that for the voltage level below 132 kV, the temporary over voltage limits as given in Table 2 shall be decided by the State Commission in the respective State Grid Code.

(d) ensure that the maximum permissible values of voltage unbalance shall be as specified in Table 3 below:-

Table 3

S.No.	Nominal System Voltage (kV rms)	Voltage Unbalance (%)
1	765 and 400	1.5%
2	220	2%
3	33 to132	3%

Provided that Bulk consumers shall avoid unbalanced load during operation:

Provided further that the distribution licensees shall ensure that their loads are not unbalanced.

(e) provide standard protection systems having the reliability, selectivity, speed and sensitivity to isolate the faulty equipment and protect all components from any type of faults, within the specified fault clearance time and shall provide protection coordination as specified by the Regional Power Committee.

Explanation.- For the purpose of this regulation "fault clearance time" means the maximum fault clearance times are as specified in the Table 4 below,-

Table 4

S.No.	Nominal System Voltage (kV rms)	Maximum Time (in milliseconds)
1	765 and 400	100
2	220 and 132	160

Provided that in the event of non clearance of the fault by a circuit breaker within the time limit specified in Table 4, the breaker fail protection shall initiate tripping of all other breakers in the concerned bus-section to clear the fault in the next 200 milliseconds.

(f) operate the system in a such a way that the Grid System is capable of withstanding one of the following contingencies without experiencing loss of stability:-

(1) outage of one single largest generating unit of the system or
(2) outage of a 132 kV Double circuit line or
(3) outage of a 220 kV Double circuit line or
(4) outage of a 400 kV Single circuit line or
(5) outage of a 400 kV Single circuit line with series compensation or
(6) outage of 765 kV Single circuit line without series compensation or
(7) outage of one pole of HVDC Bipolar line or
(8) outage of an Interconnecting Transformer