

CENTRAL ELECTRICITY AUTHORITY**NOTIFICATION**

New Delhi, the 24th, January, 2010

F.No. CEA/TETD/MP/R/02/2011.—In exercise of the powers conferred by section 177 read with clause (c) of section 73 of the Electricity Act, 2003 (36 of 2003), the Central Electricity Authority hereby makes the following regulations, namely:—

1. Short title and commencement.— (1) These regulations may be called the Central Electricity Authority (Safety Requirements for Construction, Operation and Maintenance of Electrical Plants and Electric Lines) Regulations, 2011.

(2) They shall come into force on the date of their publication in the Official Gazette.
2. Definitions.— (1) In these regulations, unless the context otherwise requires,—
 - (a) “Act” means the Electricity Act, 2003;
 - (b) “contractor” means a person or an agency who undertakes to produce a given result, not merely supply of goods or articles of manufacture but including civil works or erection of equipment or testing and commissioning of equipment or operation and maintenance of equipment and includes a sub-contractor;
 - (c) “Owner” means a company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person, which owns or operates or maintains electrical plants or electric lines and includes,—
 - (i) “Occupier” as defined in the Factories Act, 1948 (63 of 1948);

(ii) "Employer" as defined in the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (27 of 1996).

(2) Words and expressions used herein and not defined but defined in the Act shall have the meanings respectively assigned to them in the Act.

3. Regulations not in derogation of any other law.- The provisions of these regulations shall be in addition to and not in derogation of the provisions of any other law for the time being in force.

4. Safety provisions relating to Owner.- (1) The Owner shall make safety an integral part of work processes to ensure safety for employees including employees of contractor, sub-contractor as well as visitors.

(2) The Owner shall obtain accreditation of electric plants and electric lines with IS-18001 certification.

(3) The Owner shall obtain above mentioned certification for all the existing electrical plants and electric lines and those under construction within two years from the date of coming into force of these regulations and for new installations within two years from the date of commencement of construction.

(4) The Owner shall set up a sound and scientific safety management system which shall include,-

(a) formulation of a written statement of policy in respect of safety and health of employees;

(b) defining and documenting responsibilities for all levels of functionaries to carry out safety related activities including responsibilities of the contractors;

(c) preparing detailed safety manual complying with the statutory requirements and manufacturers' recommendations;

(d) establishing procedures to identify hazards that could give rise to the potential of injury, health impairment or death and measures to control impact of such hazards;

(e) providing adequate human, physical and financial resources to implement the safety management system;

- (f) providing safe working environment and evolving framework for occupational safety and health;
- (g) providing and maintaining medical facilities;
- (h) providing adequate training to all employees to keep them aware of safety related issues;
- (i) establishing system for accident reporting, analysis, investigation and implementation of recommendations;
- (j) establishing system for proper communication, documentation and record management in relation to occupational safety and health;
- (k) formulating emergency management plan for quickly and effectively dealing with probable emergencies that may arise on site as well as off-site;
- (l) establishing methodology for internal and external audit of safety management system;
- (m) establishing system for periodic monitoring and review of the safety system by the management;
- (n) overseeing the safety performance of contractors.

5. Safety manual.- Safety manual referred to in clause (c) of sub-regulation (4) of regulation 4 shall be site specific but for similar installations, common safety manual may be prepared and made applicable to such installations and these safety manuals shall cover the matters identified in Schedule-I and Schedule-II annexed to these regulations.

6. Safety officer and safety committee.- (1) (a) The Owner shall appoint one qualified safety officer where the number of employees, including contract workers, exceeds five hundred and where the number of employees is less than five hundred, a suitable officer shall be designated as safety officer:

Provided that where number of employees exceeds one thousand, one more safety officer shall be appointed for every additional one thousand employees.

(b) A person shall not be eligible for appointment as a safety officer unless he is qualified,-

- (i) under section 40-B of the Factories Act, 1948 (63 of 1948) and rules made thereunder; or
- (ii) under sub-section (2) of section 38 of the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (27 of 1996) and rules made thereunder.
- (c) (i) Where number of safety officers appointed exceeds one, one of them shall be designated as chief safety officer who shall have higher ranking than the others and he shall be in-charge of the safety functions and the other safety officers shall work under his control.
- (ii) The chief safety officer or the safety officer, as the case may be, shall be given the status of a senior executive and he shall work directly under the control of the Chief Executive.
- (d) The safety officer shall be appointed before start of construction activities and the safety set-up chart shall be prepared and properly displayed at a conspicuous place.
- (e) The safety officer shall advise and assist the Owner in fulfillment of his responsibilities concerning prevention of personal injuries and maintaining a safe working environment.
- (f) The safety officer shall be authorised to stop the execution of any work which in his judgment is unsafe and may result in injury to any person and he shall also have the power to remove the employees or contract workers from the site, if they are found not using personal protection equipment or in unsafe practice or procedure.
- (g) The safety officer shall develop and organise safety training programmes at regular intervals in order to impart proper safety training and shall also create safety awareness among the employees.
- (2)(a) where the number of employees, including contract workers exceeds two hundred and fifty, the Owner shall constitute a safety committee comprising of equal number of representatives of the management and the employees and during construction, the safety committee shall also include representatives of contractors and their employees with equal representation and the representatives of the management shall include the safety officer and medical officer:

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Provided that where number of employees, including contract workers, is two hundred and fifty or less, the safety committee shall be constituted by the Owner for a group of electrical plants or electric lines, as the case may be.

- (b) The safety committee shall promote co-operation between the workers and the management for maintaining proper safety and health at work place.
 - (c) The safety committee shall meet at least once in a month during construction stage and once in three months during operation and maintenance of electrical plants and electric lines and the decisions and recommendations of the safety committee shall be complied with by the Owner within the time limit as decided by the safety committee.
7. Safety provisions relating to contractor.- (1) The Owner shall incorporate the safety provisions in the contract document which are required to be complied by the contractor's employees during execution of the contract to facilitate safe working during execution of the work.
- (2) The contractor shall observe the safety requirements as laid down in the contract and in case of sub-contract, it shall be the responsibility of main contractor that all safety requirements are followed by the employees and staff of the sub-contractor.
- (3) The contractor employing two hundred employees or more, including contract workers, shall have a safety co-ordinator in order to ensure the implementation of safety requirements of the contract and a contractor with lesser number of employees, including contract workers, shall nominate one of his employees to act as safety co-ordinator who shall liaise with the safety officer on matters relating to safety and his name shall be displayed on the notice board at a prominent place at the work site.
- (4) The contractor shall be responsible for non-compliance of the safety measures, implications, injuries, fatalities and compensation arising out of such situations or incidents.
- (5) In case of any accident, the contractor shall immediately submit a statement of the same to the Owner and the safety officer, containing the details of the accident, any injury or casualties, extent of property damage and remedial action taken to prevent recurrence and in addition, the contractor shall submit a monthly statement of the accidents to the Owner at the end of each month.

8. Reporting of accidents.- The cases of outage of an electrical plant or an electric line of following nominal rating due to any accident related to any equipment e.g. fire, explosion of pressure piping or pressure vessel, implosion, emission of hazardous chemicals, collapse of transmission tower, flooding of power house area, shall be reported to the Authority within twenty four hours, whether or not any death or disablement is caused to any person,-

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| (a) Thermal generating units | : | 200 MW and above; |
| (b) Hydro-electric generating units | : | 50 MW and above; |
| (c) Electric lines/ sub-stations | : | 132kV and above. |

9. Emergency management plan.- (1) An on-site emergency management plan shall be formulated for thermal generating plant, hydro-electric generating plant, sub-station and group of electric lines for quickly and effectively dealing with probable emergencies like fire, explosion, gas leakages, landslides, floods, earthquakes, storms, cyclones, hurricanes, and crisis situations arising in the event of strikes, terrorist threats, attacks and sabotages, bomb threats and explosions and reducing response time.

(2) The provisions to be made for the on-site emergency management plan shall conform to the Schedule -III annexed to these regulations.

(3) The on-site emergency management plan shall be prepared by the Owner of electrical plants and electric lines before the commencement of trial operation except that for existing electrical plants and electric lines, the on-site emergency management plan shall be prepared within ninety days from the date of coming into force of these regulations:

Provided that in case of construction of electrical plants and electric lines, emergency action plan shall be prepared, before commencement of construction activity, to handle emergencies like fire, explosion, collapse of lifting appliances and transport equipment, collapse of building or structures, gas leakages, land slides, floods, earthquakes, storms, cyclones, hurricanes and crisis situations arising in the event of strikes, terrorist threats, attacks and sabotages, bomb threats and explosions.

(4) The Owner shall ensure that a mock drill of the on-site emergency management plan is conducted at least once every six months.

(5) The Owner shall arrange to furnish to the District Collector the information pertaining to industrial activities under his control, including the nature, extent and likely effects of off-site possible major accidents as well as any additional information which the District Collector may require in this regard and the minimum information to be furnished by the Owner is given as under:-

- (a) details of the key employees of the emergency team and their responsibilities;
- (b) liaisoning arrangements with neighbourhood organisations;
- (c) risk assessment information giving possible nature of incidents, events, mis-happenings which may give rise to emergency conditions in the vicinity of the premises, risk analysis and impact assessment;
- (d) information regarding type of hazardous chemicals and fuels at plant site,-
 - (i) chemicals (quantities and toxicological data);
 - (ii) fuels (quantities and storage method);
 - (ii) material safety data sheets;
- (e) internal and external communication plan in case of emergency;
- (f) details of facilities available at site,-
 - (i) fire fighting equipment;
 - (ii) details of diesel generating sets and dewatering facilities available;
 - (iii) rescue equipment available;
 - (iv) medical resources available;
 - (v) type of vehicles, mobile cranes, dumpers etc.;
 - (vi) list of contractors and details of resources available with them;
 - (vii) list of private caterers providing canteen facility;
 - (viii) list of emergency material suppliers like tents, pumps, diesel generating sets, tarpaulins etc.;
 - (ix) water resources available.

10. Medical facilities.- (1) The Owner shall provide medical facilities,-

- (a) to prevent and control occupational diseases;
- (b) to prevent and reduce disability;
- (c) to provide immediate relief to accident victims.

(2) An occupational health centre with the services and facilities as per scale laid down hereunder shall be provided for all electrical plants and electric lines and maintained in good order:-

- (a) where number of employees, including contract workers, working at one premises are fifty or less,-
- (i) the services of a medical officer on retainer-ship basis, in his clinic shall be arranged and the said medical officer shall carry out the pre-employment as well as periodical medical examination and render medical assistance during any emergency;
 - (ii) there shall be a minimum of five persons trained in first-aid procedures amongst whom at least one shall always be available during the working hours;
 - (iii) a fully equipped first-aid box shall be maintained;
- (b) where number of employees, including contract workers, working at one premises are between fifty-one and two hundred, then the Owner shall arrange for,-
- (i) an occupational health centre having the facilities for health examination, diagnosis, treatment and maintenance of health records;
 - (ii) a part-time medical officer as overall in-charge of the said centre who shall visit the premises at least twice a week and whose services shall be readily available during medical emergencies;
 - (iii) one qualified and trained dresser-cum-compounder on duty throughout the working hours;
 - (iv) a fully equipped first aid box in all the departments;
- (c) where number of employees, including contract workers, working at one premises are more than two hundred, then the Owner shall arrange for,-
- (i) an occupational health centre having the facilities for health examination, diagnosis, treatment and maintenance of health records;
 - (ii) one full-time medical officer for premises employing upto five hundred workers and one more medical officer for every additional one thousand workers;
 - (iii) one nurse, one dresser-cum-compounder and one sweeper-cum-ward boy through out the working hours;

55146)n-7

(iv) the occupational health centre shall be suitably equipped to manage medical emergencies.

(3) The medical officer of occupational health center shall be involved in planning the emergency handling of large number of injured employees in the event such as fire, explosion, natural calamities and man-made disasters and all the equipment required for providing immediate relief to the injured during emergencies shall always be kept in readiness in occupational health center.

(4) The Owner shall ensure that a fully equipped ambulance van is provided at the site for transportation of serious cases of accident or sickness to the hospital promptly and said ambulance van is maintained in good condition and equipped with necessary facilities:

Provided that where less than two hundred workers are employed, the Owner may make arrangements for procuring such facility at short notice from a nearby hospital or other place, to meet any emergency.

(5) The Owner shall put in place programme for periodic medical check-up of employees and at least the following periodic medical check-ups shall be carried out and records maintained, namely:-

- (a) once before employment to ascertain physical fitness of the person to do the particular job;
- (b) medical check-ups of all employees at intervals not exceeding twelve months;
- (c) colour vision tests and eye sight examination for drivers, skilled workers, technicians, supervisors and crane operators annually for those who are less than forty- five years old and every six months for those who are more than forty- five years old;
- (d) tests for respiratory disorders for employees exposed to dusty environment such as coal dust in thermal power generating stations once every six months.

11. Safety training and awareness.- (1) Regular safety training programmes to be conducted for employees shall include the following:-

- (a) general safety awareness;
- (b) first aid;

- (c) emergency procedures including shock treatment;
 - (d) use of personal protective equipment;
 - (e) safety precautions while handling electro-mechanical equipment;
 - (f) use of different types of fire fighting equipment;
 - (g) response in the event of emergencies including fire, flood, landslide, earthquake etc.;
 - (h) site specific hazards and the precautions as well as response in respect of the same;
 - (i) ten hours training per year to each employee;
- (2) The Owner shall ensure that adequate safety training is provided by the contractor to his employees.
- (3) Safety promotional activities shall be organised periodically to create awareness and enthusiasm among the employees which shall include organising safety day, safety week, fire safety day, fire safety week, safety competitions, posters, slogans, safety calendars and displays depicting possible consequences of unsafe acts and conditions in conspicuous locations in the plant.

Schedule- I
[See regulation 5]

Minimum contents of safety manual for construction of electrical plants and electric lines

- (A) Common to all electrical plants and electric lines:
1. Safety policy;
 2. Safety organization;
 3. Responsibilities of contractor;
 4. Responsibilities of employees;
 5. Reporting of accidents;
 6. Enquiry of accident and dangerous occurrences;
 7. Occupational health and medical facilities;
 8. Emergency management plan;

9. Location of safety equipment and emergency facilities in the plant;
10. Safety inspections and audits;
11. Safety training , awareness and promotion;
12. Hazard identification and risk assessment;
13. Personal protection equipment;
14. Communication facilities;
15. Fire prevention and protection;
16. Emergency escape routes;
17. Working at height:
 - (a) Scaffolds;
 - (b) Ladders;
 - (c) Working platform;
 - (d) Fall arresting equipment;
 - (e) Temporary stairs;
 - (f) Suspended jhoolas;
 - (g) Floor openings;
18. Safe working environment:
 - (a) Illumination and emergency lighting;
 - (b) Noise pollution;
 - (c) Harmful gases and dust pollution;
 - (d) Thermal radiation;
 - (e) Ventilation;
 - (f) Confined spaces;
19. Protection against hazardous chemicals and gases;
20. Safety in handling oils;
21. Safety in painting works;
22. Safety in transportation, earthmoving equipment and other construction equipment or machinery;
23. Safety in use of electricity;
24. Safety in handling electrical equipment such as:
 - (a) Earthing of equipment;

- (b) Working on bus-bars, transformers, circuit breakers, insulators etc.;
 - (c) Working on lines during installation of insulators, stringing of conductors, jumpering and fixing of spacers or vibration dampers;
 - (d) Extra high voltage/ high voltage static capacitor banks;
 - (e) Opening or splicing de-energised conductors or over-head ground wires;
 - (f) Storage batteries;
 - (g) Testing of medium voltage/ high voltage/ extra high voltage equipment;
 - (h) SF₆ gas filled equipment;
25. House keeping;
 26. Safety in material handling;
 27. Safety in use of lifting machines and tackles;
 28. Safety while lifting heavy equipment;
 29. Frequency and type of tests for safety equipment;
 30. Fencing of rotating machinery;
 31. Safety during demolition;
 32. Safety during excavations;
 33. Safety while working in rainy and foggy environment;
 34. Safety during blasting;
 35. Safety in tunneling works;
 36. Safety in trenches works;
 37. Handling and use of explosives;
 38. Handling of flammable gases;
 39. Safety in piling;
 40. Safety in structural steel works;
 41. Safety in concreting work;
 42. Safety in welding and cutting operations;
 43. Safety in grinding and machining;
 44. Safety in the use of hand tools and power-operated tools;
 45. Safety in waste disposal;
 46. Safety in road cutting works;

55140)11-8

47. Working adjacent to rail tracks;
 48. Working adjacent to live roads;
 49. Site perimeter fencing;
 50. Traffic management;
 51. Prevention of unauthorised entry.
- (B) Additional requirements specific to hydro-electric generating stations:
1. Safety in construction of dams and coffer dams;
 2. Safety in quarries, gravel pits and borrowed areas;
 3. Rescue equipment for prevention from drowning;
 4. Control of dust, silica and noxious gases in underground works (including ventilation of underground works);
 5. Safety in grouting, guniting, shot creting;
 6. Safety against flooding and flash floods;
 7. Working in gassy tunnels;
 8. Safety while simultaneous working in different elevations or locations in hilly areas;
 9. Suitable preventive measures against landslides;
 10. Suitable safety measures to minimise the effect of mishaps resulting on account of geological surprises.

Schedule- II
[See regulation 5]

**Minimum contents of safety manual for operation and maintenance
of electrical plants and electric lines**

The following safety features shall be additionally covered in 'Safety Manual for Operation and Maintenance' in addition to those covered in Schedule-I,-

- (A) Common to all electrical plants and electric lines:
1. Procedure for obtaining permission to work for carrying out operations and maintenance of equipment;
 2. Safety in operation and maintenance of various electro-mechanical equipment as per recommendations of manufacturers;
 3. Safety of structures and buildings;
 4. Safety in workshops and garages;

5. Safe handling, collection and disposal of hazardous waste;
 6. Safety in sub-station, switchyard and switchboards;
 - (a) Safe working clearance;
 - (b) Guarding of live apparatus;
 - (c) Operation on live apparatus;
 - (d) General provisions relating to maintenance;
 - (e) Working in areas containing exposed live high voltage and extra high voltage conductors;
 - (f) Demarcation of work areas;
 - (g) Working on remotely controlled and automatically controlled equipment;
 - (h) Working on equipment operated by or containing compressed air;
 - (i) Working on circuit breakers, transformers, isolators, surge arresters, instrument transformers, storage tanks etc.;
 - (j) Handling failed SF₆ circuit breaker;
 - (k) Working on or near to low, medium, high voltage and extra high voltage equipment;
 - (l) Procedure for adding or removing equipment to or from the extra high voltage and high voltage system.
- (B) Additional requirements applicable for thermal generating stations:
1. Safety in conveyors, belts, cableways etc.;
 2. Safety in storage and handling of materials.
- (C) Additional requirements applicable for hydro-electric generating stations:
1. Guarding of hydraulic works and mechanical equipment;
 2. Maintenance of scroll cases and draft tubes.
- (D) Additional requirements applicable for electric lines:
1. Safety measures in over head lines;
 2. Inspections and maintenance of steel towers and structures;
 3. Norms for patrolling of lines;
 4. Classification of terrain of electric lines i.e. normal terrain and vulnerable terrain;

55) 4 (11) - 9

5. Tower top patrolling;
6. Thermo vision scanning;
7. Punctured insulator detection;
8. Off-line fault location, signature analysis;
9. Maintenance schedule of electric lines;
10. Safety in washing of live insulators and testing of insulators on live lines;
11. Hot line maintenance;
12. Safety in working in underground systems.

Schedule- III
[See regulation 9(2)]

**Elements of on-site emergency management plan for electrical plants
and electric lines**

1. On-site emergency management plan shall be developed to deal with all probable emergencies which can occur at the premises such as:
 - (A) Common to all electrical plants:
 - (a) Major fire in cable gallery;
 - (b) Major fire in transformer yard.
 - (B) Specific to thermal generating stations:
 - (a) Fire in coal handling and conveyor system;
 - (b) Toxic gas dispersion caused by uncontrolled chlorine toner leakage;
 - (c) Major leakage in natural gas pipelines (e.g. full bore rupture of gas pipe line) resulting in unconfined natural gas leakage leading to vapour cloud explosion and fire;
 - (d) Major hydrogen gas leakage from generator leading emergency situation that can lead to fire and explosion;
 - (e) Boiler drum burst;

- (f) Implosion or explosion of boiler furnace;
 - (g) Large scale fire in fuel oil area, coal storage, naphtha or liquefied natural gas storage area.
- (C) Specific to hydro-electric generating stations:
- (a) Flooding of powerhouse;
 - (b) Landslides.

2. On-site emergency management plan shall include the following:-

- (a) Name and address of the Chief Incident Controller;
- (b) Alarm system and method of reporting and declaring emergency;
- (c) Emergency response procedure including response to off-site emergency management plan and crisis and disaster management plan;
- (d) Details of the key employees of the emergency team and their responsibilities;
- (e) Addresses and contact numbers of local administration, police, hospitals, involved in assisting during emergency;
- (f) Risk assessment information giving possible nature of incidents and events giving rise to emergency conditions, risk analysis and impact assessment;
- (g) Details about the site:
 - (i) Locations where emergency may arise;
 - (ii) Emergency control room and alternate emergency control room;
 - (iii) Demarcation of safe assembly zone relevant to each type of emergency condition;
- (h) Description of hazardous chemicals and fuels at plant site:
 - (i) Chemicals (quantities and toxicological data);
 - (ii) Fuels (quantities and storage type);
 - (iii) Material safety data sheets;
- (i) Internal and external communication plan during emergency;
- (j) Details of fire fighting and other facilities available to deal with emergency conditions;

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- (k) Details of first aid and hospital services available and their adequacy;
- (l) Post emergency activities:
- (i) Collection of records;
 - (ii) Conducting enquiries and concluding preventive measures;
 - (iii) Making insurance claims;
 - (iv) Preparation of enquiry report and suggestion scheme;
 - (v) Implementation of enquiry report recommendations;
 - (vi) Rehabilitation of affected persons within plant;
 - (vii) To re-start the plant.

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