

No.VIII-11011/07/16-GCD
Ministry of Home Affairs
Directorate General Fire Service, Civil Defence & Home Guards
(Fire Cell)

East Block-VII, Level-VII,
R.K. Puram, New Delhi-110066
Dated : 29.08.2017

To,

Secretary (Power)
Ministry of Power,
Shram Shakti Bhawan,
Parliament Street,
New Delhi.

Subject: Transformer fire in India.

Sir,

Transformer fire in India is increasing day by day. Some of the notable fire incidents are 220 KV Wardha Sub Station (2016), 11/110 KV Generating Transformer at Kakad Power Station (2016), 400 KV Bellary Thermal Power Station of KPCL (2015), Sarni Thermal Power Plant (July, 2015), NTPC Kaniha Power Plant, Talcher (March, 2016), Shree Singaji Thermal Power Plant, Khandwa (2013 & 2015), Hydro Power Station of NHPC, Uri (2015) etc. Huge property loss reported in above transformer fire incidents. Therefore, there is a need to relook on the existing standards and the recommendations on Fire Prevention and Protection in vogue issued by Central Electricity Authority.

1. Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010 recommended for various fire detection, alarm and protection system (Annexure-1).

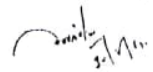
3. The recommendations are broadly focused on Fire Protection and extinguishing methods besides suitable equipment like providing automatic high velocity water spray system for transformer of rating 10 MVA and above or oil filled transformer with oil capacity of more than 2000 litres be provided with Nitrogen injection based fire protection system etc. Nothing has been mentioned about fire prevention measures. NFPA 850 – “Recommended practice for fire protection for electric generating plants and high voltage direct convertor stations”; Chapter 3, para 3.3.6 specified about Depressurization System – “A passive mechanical system designed to depressurize the transformer a few milliseconds after the occurrence of an electrical fault” and further verified at annex-A under Explanatory Material para A.5.1.4.2(9) – Therefore, “Oil filled transformer explosions and fires can be prevented in some cases by the installation of a passive mechanical system designed to depressurize the transformer a few milliseconds after the occurrence of an electrical fault. This fast depressurization can

be achieved by a quick oil evacuation triggered by the dynamic pressure peak generated by the short circuit. The protection technology activates within milliseconds before static pressure increases, therefore preventing transformer explosion and subsequent fire."

4. In view of the latest development and technological advancement in the fire prevention of transformers there is a need to review the Central Electricity Authority's notification issued in 2010 to avoid the recurrence of transformer fires in India.

5. You are requested to kindly instruct the concerned authority to look into the matter and immediately update the old regulations.

Yours faithfully,



(Prakash Mishra)

Director General (FS, CD & HG)

Tel: 26712851

Copy to: Secretary, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi.

Copy to: All the Heads of fire services
in the states/UTs.

22/9/2017

(c) Fire detection, alarm and protection system

- (a) A comprehensive fire detection, alarm as well as fire protection system shall be installed for the Station in conformity with relevant IS. In addition, all buildings shall conform to National Building Code. Fire protection system shall be designed as per the guidelines of Tariff Advisory Committee (TAC) established under Insurance Act 1938 and/ or NFPA.
- (b) Automatic fire detection and alarm system shall be intelligent and addressable type and shall be provided to facilitate detection of fire at the incipient state and give warning to the fire fighting staff.
- (c) Major equipment to be used for fire detection and protection system shall be in accordance with Indian Standards or UL (Underwriters Laboratories, USA) or FM (Factory Mutuals, USA) or LPCB (Loss Prevention Certification Board, UK) or VDS (Germany).
- (d) Dedicated fire water storage and pumping facilities shall be provided for the fire fighting system as per TAC guidelines. Main fire water pumps shall be electrically driven and standby pumps shall be diesel engine driven.
- (e) Hydrant system, complying with TAC guidelines, shall be provided at various locations to cover the entire Station.
- (f) All major and minor fire risks in the Station shall be protected against fire by suitable automatic fire protection systems. Following systems shall be generally adopted for various fire risks:
 - (i) Automatic high velocity water spray system, complying with TAC guidelines, shall be provided for the following areas:
 - (A) Transformers of rating 10 MVA and above or oil filled transformers with oil capacity of more than 2000 litres;
 - (B) Alternatively, these transformers may be provided with Nitrogen injection based fire protection system. The transformers of 220 kV or higher voltage may preferably be provided with Nitrogen injection based fire protection system in addition to automatic high velocity water spray system;
 - (C) Lubricating oil systems including storage tanks, purifier units, coolers, turbine oil canal pipelines;
 - (D) Generator seal oil system tanks, coolers;
 - (E) Steam generator burner fronts.
 - (ii) Steam turbine bearing housing and air pre-heater shall be provided with manually actuated high velocity water spray system.

(iii) Automatic medium velocity water spray system, complying with TAC guidelines, shall be provided for the areas relating to:-

- (A) Cable galleries, cable vaults, cable spreader rooms, cable risers, cable shafts etc.;
- (B) Coal conveyors, transfer points, crusher houses etc;
- (C) Fuel oil pumping stations;
- (D) LDO and day oil tanks;
- (E) DG set building.

(iv) Automatic foam system shall be provided for fuel oil storage tanks as per NFPA guidelines.

(v) Automatic inert gas flooding system, comprising of 2x100% inert gas cylinder batteries and conforming to NFPA, shall be provided for Unit control rooms, control equipment rooms and area above false ceiling of these rooms.

- (g) Portable fire extinguishers as per TAC guidelines shall be provided for each room/ area of power station in addition to fixed fire protection system to extinguish fire in its early phase to prevent its spread.
- (h) Fire station and fire tenders alongwith trained staff shall also be provided for the Station.
- (i) Passive fire protection measures such as fire barriers for cable galleries and shafts etc., fire retardant coatings, fire resistant penetration sealing for all openings in floors, ceiling, walls etc., fire proof doors etc., shall be provided to prevent spreading and for containment of fire.