

I/21918/2022

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भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केंद्रीय विद्युत प्राधिकरण

Central Electricity Authority

तापीय अभियांत्रिकी एवं प्रौद्योगिकी विकास प्रभाग

Thermal Engineering &amp; Technology Development

सेवा में / To,

सभी ताप विद्युत उत्पादन संयंत्र / All Thermal Power Generating Plants/Utilities

**विषय/Subject: Safety Advisory to all Thermal Power Generating Utilities.**

महोदय/महोदया / Sir/Madam,

You may be aware that Hon'ble National Green Tribunal vide its Order dated 22.12.2020 in O.A. No. 108/2020 with O.A. No. 130/2020 had directed that "Secretaries, Ministry of Power and Coal, Government of India, in coordination with such other Departments/ Institutions, as may be necessary, to undertake Safety Audits of similarly placed thermal power stations throughout the country expeditiously preferably within six months to avoid recurrence of such incidents in future".

In compliance to the aforesaid order, a Safety Audit Committee under the chairmanship of the undersigned was constituted by Central Electricity Authority (CEA) comprising representatives from Ministry of Coal, Central Boiler Board (CBB), Director General Fire Safety (DGFS), NTPC Ltd., NLC India Limited (NLCIL), Bharat Heavy Electrical Limited (BHEL) and other experts. The above Committee carried out the safety audit of different coal/lignite based Thermal Power plants across the country during the period of August to November 2021.

A safety advisory based on the broad deficiencies observed during above safety audits of the thermal power stations is enclosed at Annexure-I for your kind information and needful actions. However, safety of plant and personnel is not limited to these findings only. Utilities/plants may also continue to take regular safety measures as per the extant Rules and Regulations in this regard.

संलग्नक/Enclosure: यथोपरि/As above

भवदीय/Yours Sincerely,

(धीरज कुमार श्रीवास्तव / Dhiraj Kumar Srivastava)

मुख्य अभियंता / Chief Engineer

I/21918/2022

Annexure-ISafety Advisory to all Thermal Power Generating Utilities**(A) General Safety and Fire Safety**

1. Implement the requisite provisions of (1) Central Electricity Authority (Safety Requirements for Construction, Operation and Maintenance of Electrical Plants and Electric Lines) Regulations, 2011 (2) Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010 (3) Statutory requirement under Factories Act and other related Acts such as Manufacture, Storage, and Import of Hazardous Chemicals (MSIHC) Rules, 1989 – entrusted functions and Response Rules (4) IS:1646 - Code of Practice for Fire safety of buildings (general): Electrical installations (5) IS:3034 - Fire safety of industrial buildings: Electrical generating and Distributing stations - Code of Practice.
2. Internal Safety Audits must be carried out once a year through cross functional teams/ internal trained staff and records must be maintained. Further, External Safety Audit must be carried out through registered Agencies at a regular periodicity of 2 years and Action Taken Report (ATR) must be prepared & monitored to ensure early closing of pending recommendations.
3. Ensure a separate budget head in its overall budget provisions to adequately fund safety related activities. Detailed safety manual complying with the statutory requirements and manufacturers' recommendations must be available with power plant.
4. Safety awareness drives must be conducted amongst plant personnel as well as the employees deployed by the Contractors, periodically for the compliance of provisions of safety manuals and to imbibe the safety culture.
5. The safety officer shall be appointed and safety committee shall be constituted by thermal power plant as per the statutory requirement. Plants shall hold Safety Committee meetings regularly and Head of Plant shall chair these meetings. The output of these Safety Committee meetings should be implemented.
6. Ensure that 'Safety Performance' KPA (Key Performance Area) for employees is linked with Annual Performance Assessment for officers at various levels to instill a safety-compliant behavior.
7. Keep an updated inventory of safety related PPEs and also provide the tasks specific PPE kits to all the workers/ staff.
8. All major/ minor accidents must be properly investigated and analyzed to find the Root Cause of incident/accident.
9. Implement procedures for reporting of accidents by the concerned Power Station to CEA in line with the provisions of the CEA safety regulations.

I/21918/2022

10. Emergency Response Disaster Management Plan (ERDMP) both On-site & Off-site shall be prepared by all power plants.
11. Ensure that a functional proper Public Address system is in place and also 'Walkie/ Talkie' should be mandatorily adopted in the power plants.
12. Plants must be compliant/ certified as per ISO: 45001 'Occupational Health & Safety Management System'.
13. Ensure that all fire safety procedures are followed and fire-fighting system, its operation, installations are well maintained and upkeep of various sub-components is reviewed at regular intervals to make sure their proper response during emergencies. These shall include but not be limited to the following:
  - i. Fire Water pump house must be maintained in proper healthy condition. There should be no obstructions in the pathways and approaches to equipment should be hindrance free.
  - ii. All fire hydrant pumps and jockey pumps must be maintained in healthy condition. The Fire Hydrant pumps need to be operated in 'AUTO MODE' & Sequential starting system should be in place. The reliability & availability of the Pumps are to be checked at frequent intervals and recorded.
  - iii. Fire-fighting crew along with some identified regular employees must go through hands-on firefighting training including rescue and disaster handling to enhance effectiveness of firefighting & safety crew.
  - iv. Manual call points (MCPs) must be provided at all the strategic locations of the power stations and must be integrated with the Fire Control Room for effective monitoring and to ensure timely & quick response from fire-fighting crew.
  - v. Mock drills should be conducted at regular intervals and also at odd hours for various emergencies scenarios & debriefing session should be conducted after each mock drill. The gaps observed are to be analyzed and mitigation measures need to be taken. These details should be recorded in a register.
  - vi. Fire Marshalls/ firefighting crew should be trained for actual emergencies scenarios.
  - vii. Each Power Station shall have a Fire Emergency Plan formulated so as to facilitate organized actions (in case of fire) by employees at various levels, during day as well as night and shall also contain the instructions on fire prevention measures and the firefighting organization.
  - viii. Fireboxes with hose reels at fire hydrant points must be available.
  - ix. Non-sparking tools and flame-proof electric fittings should be mandatorily used at all places where flammable materials like oils and gases are stored/ are in use. Also, static electric charge dissipater should

I/21918/2022

be provided at the entry gate of such systems which are prone to catch fire easily.

14. Emergency exit path marking should be made available for safe evacuation of working personnel during emergency conditions. Emergency telephone numbers must be prominently displayed at prominent locations in the plant, such as at TG floor, Unit Control Room & emergency exit points etc. Display of DO's & DON'Ts should be done in large fonts for better visibility. All such Display Boards should have a DC backlit display.
15. Lock Out & Tag Out (LOTO) system for maintenance management should be fully implemented for safe operation of the power plants and a proper Permit to Work (PTW) system must be followed and there should be seamless integration between LOTO & PTW System (and also to ERP system, if available). Proper Job Safety Analysis (JSA) should be carried out before issuance of each PTW.
16. Accumulated and unwanted scrap/ dismantled machinery etc. should be removed from working areas such as boiler structure, TG floor etc. and stored at designated places. Measures should be taken to remove wild vegetation growth in switchyard.
17. Excessive accumulation of coal/ lignite dust in some of the vulnerable areas like Crusher house, transfer points, coal/ lignite Bunker house, etc. must be avoided.
18. Preventive measures such as anti-corrosion painting and regular maintenance should be done for support structures and various equipment.
19. Rotating parts of various equipment should be covered with proper guards.
20. SOPs for various plant equipment to be prepared and made available to working personnel.

#### **(B) Boiler, Turbine and Generator (BTG) Safety**

1. As per IBR Regulations, periodic Remnant Life Assessment (RLA) should be carried out.
2. Annual overhauling, Capital overhauling and Renovation & Modernization works must be done on time as these prevent equipment failures. Overhauling work should be monitored comprehensively.
3. The boilers must be operated by Boiler Operating Engineers (BOEs) in compliance with the provisions of IBR. Utilities with shortage of BOEs are advised to take immediate and urgent steps to ensure that sufficient number of engineers should be qualified BOEs.
4. Boilers having box type column-beam structure are prone to accumulation of coal/ash dust if there are openings in the boiler structure. Coal dust accumulated in such confined structure may lead to fire/explosion. All such openings in such kind of structure must be closed. Also, cleaning must be ensured before closure.

I/21918/2022

5. Thermal insulation of Boiler, Turbine, associated sub-systems and all other critical equipment & lines must be ensured and maintained in good health. Regular thermal survey for surface temperature should be done. It is recommended to do insulation of.
6. Pulverized fuel leakage in mills, pipes, joints etc., if any, should be arrested on immediate basis.
7. The closeness of steam lines with other components/structure of Boiler or adjacent civil structure must be avoided.
8. All Boiler expansion indicators must be fitted properly to measure vertical movement as well as horizontal movement.
9. Mandatorily carry-out tool tagging to have effective inventory management and thus ensure timely availability of all tools & tackles. Tagging and marking date of last load testing of all O&M tools & tackles must be ensured.
10. Illumination measurement should be carried out as per IS:6665 and it needs to be improved in the plants wherever necessary.
11. Take measures to ensure that ambient noise levels around equipment like Turbine-Generator, Boiler etc. auxiliaries are in desired limits.
12. Regular ash level monitoring in ESP hoppers must be done by providing Ash Level Indicators (ALI). Timely steps must be taken for regular evacuation of ash. Also, ensure that ash hopper heaters are in healthy condition so that fluidity of ash is not hampered.
13. Safety Valves and Electromatic Relief Valves (ERVs) must be maintained in healthy condition and operative.
14. Vibration levels of machines such as TG set, fans, pumps, etc. must be monitored on regular basis and machines should not run beyond the recommended vibration limits prescribed by OEM.
15. Compulsorily carry out turbine over speeding test as per OEM recommendations.
16. Regularly perform checks for functionality of all the Protection & Interlocks (P&I) for various equipment and system.

### **(C) Balance of Plant (BoP) Safety**

1. Chlorine leak sensor probes must be provided for all chlorine cylinder bays at proper locations. Water sprinkler system need to be installed in chlorination plant to neutralize chlorine leak in addition to the extant system.
2. Dust suppression system must be in operating condition to prevent coal/ lignite dust accumulation in areas such as coal/ lignite yard, Crusher house, transfer junctions/ points, coal/ lignite conveyor, coal/ lignite Bunker etc.
3. Battery Room is to be properly lined with 'Acid resistance tiles' up to the height of 'Battery Bank'. It is suggested to provide Flame-proof lighting in the Battery

I/21918/2022

room. It is also to be ensured that the Eye-wash system is located at a place nearby to the Battery Room.

4. Cable gallery/ racks must be maintained in healthy conditions with proper illumination levels, exhaust system and the cable dressing in the racks should be done properly. All entry & exit of cables must be sealed properly for preventing progression of fire and toxic gases to adjacent rooms.
5. Insulating floor or mat conforming to IS:15652 of appropriate voltage level shall be provided in front of the panels for the safety of operating personnel.
6. Regularly measure and maintain proper records of Resistance value of Earth pits and monitor Tan-Delta value of current transformers (CT) and all other oil-filled electrical equipment.
7. Oil soak pits of transformers should be kept free of waste material.
8. Manuals and Standard Operating Procedures (SOPs) for Ash Bund/ Dyke Maintenance should be prepared by Power Plant. Emergency Plan should be prepared to deal situations of Ash Dyke breach and should be made available to the Site engineers.

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