



सत्यमेव जयते  
भारत सरकार

Government of India

विद्युत मंत्रालय/Ministry of Power

केन्द्रीय विद्युत प्राधिकरण/Central Electricity Authority

मुख्य विद्युत निरीक्षणालय प्रभाग/Chief Electrical Inspectorate Division

-18एशहीन जीत मार्ग, कटवारिया सराय-नई दिल्ली -110066

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संख्या : CEI/1/9/2018/1075

Dated: 24.07.2018

To:

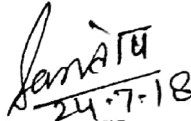
Sh. M. Ekka  
AGM (ELX), GPX AREA  
BHEL, PIPLANI, BHOPAL-462022

**Subject:** Report of Inspection carried out at BHEL, Bhopal.

This has reference to BHEL, Bhopal letter no. ELX/BHEL/18/01 dated 10.05.2018 wherein BHEL Bhopal informed that there was a flashover incident at around 5:45pm on 25th April 2018 in 11 kV PT of Blk-2 West, 11kV/415V substation in BHEL, Bhopal during scheduled preventive maintenance work.

In this regard, an inspection was done on 17.06.2018. In this connection, please find enclosed the report of the incident given at Annexure-I.

This issue with the approval of Chief Engineer, CEI.

  
24.7.18  
(Santosh Kumar)  
Dy. Director

**Report on Inspection Carried Out at BHEL, Bhopal**

BHEL, Bhopal vide letter no. ELX/BHEL/18/01 dated 10.05.2018 reported an electrical accident. BHEL Bhopal informed that there was a flashover incident at around 5:45pm on 25th April 2018 in 11 kV PT of Blk-2 West, 11kV/415V substation in BHEL, Bhopal during scheduled preventive maintenance work. After completion of work, when 11 kV supply was switched on, one 11kV oil type metering PT got burst and burning oil spread out all round due to which following persons got injured:

- Shri S S Paraste, BHEL Employee, Sr. Technician
- Shri Israr Ali, Contract Worker of M/s INCAS Pvt. Ltd.,
- Shri Chandra Sekhar, Contract Worker of M/s INCAS Pvt. Ltd.

Above three injured persons were admitted to the hospital immediately. During the course of treatment, Shri Israr Ali expired on the morning of 07-May-2018. The Postmortem report has been received. Other two persons are undergoing treatment at the hospital.

Chief Engineer, CEI Division, Central Electricity Authority had nominated Shri Santosh Kumar, Dy. Director, CEI Division, CEA to inspect the site of the accident, interview the people associated with it, look into the probable causes of the accident, suggest improvements if any and submit a report.

Shri Santosh Kumar visited BHEL Bhopal on 17.06.2018 and conducted an enquiry into the incident. Concerned officials of BHEL, Bhopal were present:

1. Shri Samir Paul, Manager (ELX)
2. Shri Binoy Kumar, AGM (HRM)
3. Shri M Shrivastava, Sr. DGM (MSE)
4. Shri Amol Choubey, Dy. Manager (HR)
5. Shri Mahesh Ekka, AGM (ELX)
6. Shri Biplab Mondal, AGM (ECX, GPX, EMX)
7. Shri N K Bowade, Sr. Accttounts Officer (HR)
8. Shri Janmejy Singh, Sr. Law Executive
9. Shri S P Portey, Assistant Engineer
10. Shri C K Jain, Sr. Engineer

Shri Vishal Garg, Director, INCAS Pvt. Ltd. was also present.

*Santosh*

### **Brief Description of Job and the Accident**

On enquiring about the details of job and incidents, Shri C K Jain, Sr. Engineer informed that Preventive Maintenance for Block 2 (W) substation was planned by ELX Deptt. & being executed by M/s Ingenious Consultants & Services Pvt. Ltd. (M/s INCAS Pvt. Ltd.) on 25.04.2018. It was being carried out by seven contract workers of M/s INCAS Pvt. Ltd. Sh.S.P.Portey Astdt Engineer gr.II, & Sh.S.S.paraste, Sr. Technician of BHEL, Bhopal were deployed for guidance and monitoring of the work. However, as reported there was no supervisor deployed to supervise the work from the contractor side. He, further, informed that the preventive maintenance work was started around 12pm on 25-04-2018 after taking shutdown and isolating the 11KV HT bus. At about 4.00pm, he visited the site to check the status of work and went away for other official work. At about 4.45pm, Shri C K Jain visited the site again to check the progress and found that the voltmeter at the HT panel side was not showing any voltage. Therefore, he asked Sh.S.P.Portey to get the fuses of PT (Potential Transformer) of the HT panel checked and left the substation.

Sh.S.P.Portey Astdt Engineer gr.II, informed that HT Bus was charged after completion of preventive maintenance work and everything was normal. After some time, Shri C K Jain, Sr. Engineer came and found that HT panel side was not showing any voltage. Therefore, he instructed Sh.S.P.Portey to get the fuses of PT of the HT panel checked and left the substation. 11kv bus supply was again taken on shutdown and PT box was racked out, opened & HT fuses were checked and found OK. Then the HT fuses were reinserted and the PT box was racked in again. Thereafter, HT Panel was charged by switching on the 11kV IB4 switch. The PT burst immediately after switching on the 11kV IB4 switch and hot oil spread out all around and also fall on to Shri S S Paraste, Shri Israr Ali and Shri Chandra Sekhar standing nearby.

### **The observations of Inspecting Officer:**

On the query of the undersigned that whether voltmeter of HT Panel was functional before preventive maintenance work or not, neither Shri C K Jain nor Sh.S.P.Portey was able to ascertain it. During inspection, it was found that PT box was racked out and was kept in a store room. HT fuses were found broken and contact terminals of bushing were chopped off. By seeing the PT box and its condition, it could not be ascertained whether HT fuses and contact terminals of bushing were broken before the blast or after the blast. It was also reported that everything was normal when HT panel was charged after completion of preventive maintenance work. Blast occurred only after the checking of the HT fuses which were immersed in oil of PT box. For checking the HT fuses and racking in the PT and charging the HT panel subsequently. On question whether any test of PT oil was done before the charging of HT panel, it was informed

*Sanat*

that no oil test was done and oil is generally replaced after five years. Therefore, the quality of oil cannot be ascertained.

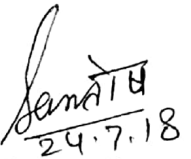
**Possible reasons of the accident:**

After inspecting the racked out portion of PT and interacting with engineers of BHEL & concerned persons associated with preventive maintenance work, it was observed that PT got burst only after the insertion of HT fuses and racked in of PT box. The blast might be occurred due to sparking and pressure build up inside the PT after charging the HT Panel. The sparking inside the PT may be due to following reasons:

1. There may be possibility that PT was not in service before preventive maintenance as the BHEL engineers could not be able to ascertain the working of the voltmeter of HT Panel before the work of preventive maintenance. After the checking of HT fuses, there may be possibility that HT fuses came into the circuit and PT got burst due to inrush of huge surge current due to some existing faults and due to deteriorated condition of oil.
2. Improper fitting of HT fuses while reinserting after checking them.
3. Failure of bushing at the contact terminal inside PT due to possible misalignment during racked in of PT box.

**Recommendations:**

1. Replacement of present HT Panels with VCB panels.
2. Until the HT Panels are replaced with VCB panels, remote operation of IB4 switches shall be done while charging the 11kV bus of HT Panel.

  
24.7.18  
Santosh Kumar,  
Dy. Director,  
CEI, Division, CEA