

# MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO. LTD.

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Ref.No.: MSETCL/CO/Trans (O&M)/Tech.CIR/ 8934

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### CIRCULAR

**Sub: Undesirable trippings of 400/220kV ICTs on Neutral Displacement Relay (NDR) protection at various 400kV S/s.**

Recently no. of incidents of unwarranted trippings of 400/220 kV ICTs on NDR protection during pre-monsoon rains have been reported at various 400 kV substations in our system. This is really a matter of serious concern & needs to be addressed immediately by suggesting suitable remedial measures/corrective actions. A detailed review of existing NDR protection, its setting & other related aspects was taken in the Standing Protection Committee (SPC) meeting held at C.O. on 20/06/2012. Various issues were discussed and deliberated at length & following guidelines are issued to resolve this problem of undesirable operation of NDR protection:

1.0 The following settings are to be adopted for NDR with immediate effect:

**Alarm setting :** 12.5V, 1sec.

**Trip setting :** 30V, 4.5sec.

The above settings are to be adopted wherever possible. In case of static (IDMT) relays, maximum possible voltage setting with TMS of 0.1 may be adopted. Else, the above settings can be provided by providing external timer.

"In case of NDR alarm, the on duty In-charge / operator should immediately carry out the yard inspection particularly that of Tertiary Delta arrangement of ICTs & report abnormality observed, if any, to the concerned authorities."

**\*Note:** Do not change the NDR setting & PTs at 400kV S/s where no unwarranted operation of NDR has been reported last year & this year during the pre-monsoon rains.

- 2.0 Thorough cleaning of 33 KV or 20 kV bus support insulators, PTs, LAs & Tertiary bushing of ICTs need to be ensured from time to time i.e. whenever an outage is availed on the ICT., this activity should invariably be carried out. It is to be ensured that the dust is not accumulated on equipments in delta system at all, which otherwise may create the problem during subsequent rain.
- 3.0 The Capacitance & Tan Delta measurement of Tertiary bushings to be done invariably in the month of April and also prior the on-set of monsoon every year.
- 4.0 The insulating taping / coating of proper insulation level to be done to the IPS tube used for delta connection. Further, insulating coating to be applied on Bus Post Insulators, LAs, Tertiary Bushing to achieve enhancement/ increase in creepage distance of external insulating part. This activity is to be carried out only after cleaning is done as above.

**5.0 Standardization of NDR protection:**

**5.1** Numerical protection having DR facility to be used.

**5.2** Relay should have two independent functions:

**5.2.1** Working on direct open delta voltage with selectable definite & inverse time characteristic.

**5.2.2** Working on derived open delta voltage from three phase voltage input with selectable definite and inverse time characteristic.

**5.2.3** Relay should respond to only fundamental frequency voltage with blocking for other harmonic voltages.

**5.2.4** It is to be checked, if both the functions are available in the same relay or separate relays are to be used. Further, the possibility of meeting above functions in the existing numerical protection, in service, need to be explored so as to avoid requirement of separate new relay.

**5.3** The relay working directly on open delta voltage should be used for DR / Alarm purpose only and no trip to be extended.

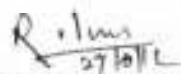
**5.4** The relay working on derived open delta voltage should be used for Trip purpose.

**5.5** The annunciation should be provided for "NDR protection Alarm" and "NDR protection Trip" from both the functions.

**6.0** Suitable series connected Damping Resistor needs to be provided in the delta secondary winding. The VT-guards (ABB-make) to be provided in the NDR circuitry for ICTs at 400 kV Akola & Khaperkheda S/Ss on experimental basis & to be kept under observation

**7.0** The possibility of using tertiary bus post insulators with higher creepage distance should be explored for new projects. It has been decided to adopt this arrangement for new (4<sup>th</sup>) ICT bay at Padghe.

The above guidelines shall come into force with immediate effect & should be followed scrupulously henceforth.

  
**Chief Engineer (Tr.O&M)**

**Copy s.w.r. to:-**

- The Director (Operations), MSETCL C.O., Mumbai.
- The Director (Projects), MSETCL C.O., Mumbai.
- The Executive Director (Operations), MSETCL C.O., Mumbai.
- The Executive Director (Projects), MSETCL C.O., Mumbai.

**Copy f.w.cs. to:-**

- The Chief Engineer, EHV CC O&M zone, MSETCL, Amravati/Aurangabad/Karad/Nagpur/Nasik/Pune/Vashi
- The Chief Engineer, TR(Projects & Design), MSETCL, C.O., Mumbai
  - The guidelines at Sr.No.5.0 & 7.0 above needs to be considered for all future project works.

**Copy to:-**

- The Superintending Engineer, T & C Circle, MSETCL, Akola/Aurangabad/Karad/Nasik/Nagpur/Pune/Vashi
- The Superintending Engineer, Tr.(O&M) Circle, MSETCL, Amravati/Aurangabad/Bhusawal/Chandrapur/HVDC Chandrapur/HVDC Padghe/Kalwa/Karad/Kolhapur/Nagpur/Nasik/Panvel/Parli/Pune/Solapur