

## **UNIT TRIPPING REPORT**

UNIT No: 2  
TUTICORIN.

STATION: NTPL,

OUTAGE: NO. 28

REPORT NO: 28

- |  |                                |
|--|--------------------------------|
| 1.Date of tripping   | : 31-08-2018                   |
| 2.Time of tripping   | : 04:40:22 Hrs                 |
| 3.Status before tripping   |                                |
| a) Unit load   | : < 2.0 MW                     |
| b) Mills in service  | : B & D                        |
| c) Oil guns in service   | : 10 HFO                       |
| d) Boiler feed pumps in service  | : TDBFP A                      |
| e) CEPs in service   | : A&B                          |
| f) ID fans in service  | : A&B                          |
| g) FD fans in service  | : A&B                          |
| h) PA fans in service  | : A&B                          |
| i) CWP in service  | : A&B                          |
| 4.First Up protection acted  | : Gen Trip (Low Forward Power) |
| 5.Similar occurrences in the   |                                |
| Financial Year   | : Nil                          |
| 6.Other relays/protection acted  | : Generator trip/ Turbine trip |
| 7.Supporting documents attached  | : SOE / EHC output tabulation. |
| 8.Any operation done prior to tripping   | : Nil                          |
| 9.Analysis of tripping   | :                              |
| ➤ Speed controller output was varying from 14 to 24% and hence the Actual TG Speed was varying from 2980 to 2996 rpm before synchronization, while the speed reference set was at 3006 rpm. After synchronizing Generator Circuit breaker closed, but got opened on “Low Forward Power” since the actual block load was below 2.5 MW for more than 10 seconds. Speed reference set point was inadequate to achieve block load after synchronization, leading to the tripping of generator. |                                |

10. Root cause :

Speed set point was raised by 15 rpm by the board engineer for a block load of 50 MW, i.e. from 3006 to 3021 rpm. But the rise in speed controller output to 25% was not adequate for raising the load above 2.5 MW in 10 seconds which led to generator trip on “Low Forward Power”.

This is believed to be due to three main reasons: -

- 1) The deviation in the relation between HP and IP Control valves characteristics, caused SC Output variations, which resulted in speed hunting before synchronizing.
- 2) The deviation of  $N_{rtd}$  and  $N_{act}$ , of about 12 rpm, has also led to insufficient SC output after synchronizing.
- 3) Due to auto-synchronizing in the negative direction, there was a dip in actual machine speed immediately after synchronizing.

11. Remedial measures taken/to be taken:

IPCV start-of-opening at present is at 3.6 Ksc of IP Secondary Oil pressure, when HPSO pressure is 3.4 Ksc. HPCV start-of-opening is at 3.2 Ksc HPSO pressure. At 3000 rpm set point, all the four control valves were participating, leading to hunting of speed. IPCV opening can be delayed to 3.7 Ksc of HPSO, which will eliminate speed hunting due to IPCV opening at 3000 rpm.

12. Time/Date of boiler light up and sync :

Light Up:                      Boiler in service  
Sync'd :                      05:40 Hrs on 31/08/18

13. Delay for light up : Boiler in service

14. Recommendation / Action plan :

Sl.No.	Recommendations/Action plan	Responsibility	Time line
1	Relationship between HP & IPCV characteristics will be corrected at the next opportunity.	TM & OS	Opportunity

2	Difference between Speed reference set point and Actual speed should be eliminated, to establish minimum block load.	C&I	Immediate
3	During auto-synchronizing, care must be exercised to synchronize in the positive direction.	Opn	Immediate

15.Any specific learning / feedback :

While synchronizing, take care to increase the speed set point to get block load thereby avoiding generator tripping on LFP protection, in future. Variations in Grid frequency should be watched, when speed loop is in control, in order to maintain a minimum block load. EHC should be changed over from Speed Loop to Load Loop immediately after getting around 50 MW.

CM / OS

CM/EEMG

DGM / C&I

DGM / ELECT

DGM / O&C

Copy submitted to GM/O&M

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