TRIP ANALYSIS REPORT

TRIP ANALYSIS REPORT /TAR-07/ UNIT 1 / 2016 **Dt. 30-11-16**

OCCURRENCE:

(a) **Condition:** Load: **480 MW** at 8:24 hrs. on 27.11.16 with 6 Mills and coal flow 278T/hr. in LP mode.

(b) **Incident:** Turbine got tripped on MS temperature very low at 8:30:58 hrs and Boiler got tripped at 8:31:28 hrs on MFT (RH protection) on 27.11.16.

OBSERVATIONS FROM SOE/ALARM PAGES AND BOARD ENGINEER FEEDBACK:

8:25:31 hrs: ID FAN-B CH1 SRC BRKR Current very high

8:25:38 hrs: IDF-B VFD CH1tripped.

8:25:38 hrs: IDF-B tripped.

8:25:39 hrs: FDF-B tripped

8:25:44 hrs: Feeder-H tripped.

8:25:46 hrs: Feeder –G tripped

8: 29:15 hrs: Main steam temperature low.

8:30:19 hrs SH spray control taken manual.

8:30:33 hrs: Main steam temperature very low.

8:30:58 hrs: TP2 main stm temperature very low.

8:30;58 hrs: Turbine trip CH2.2 CMD

8:30:58 hrs: Turbine Trip CH2.3 CMD.

8:30:59 hrs: Turbine tripped.

8:31:02 hrs: HP BP fast open

8:31:03 hrs: Generator breaker open.STG Trip relay 186A.

8:31:07:hrs: MDBFP AOP auto start

8:31:07 hrs: MDBFP rapid start up 92 vlv auto open.

8:31:08 hrs: Pulveriser E tripped.

8:31:13 hrs: Drum level low alarm.

8:31:13 hrs: MDBFP on.

8:31:16 hrs: HP BP closed.

8:31:22 hrs:Drum level very low.

8:31:26:hrs: TDBFP 2B manual off.

8:31:26: hrs: Loss of RH protection acted.

8:31:27 hrs MFT CH 1

8:31:27 hrs MFT CH3

ANALYSIS:

Unit was in service with a load of 502 MW in LP mode with 6 mills (A, B, C, E, G&H), coal flow 287 T/hr around 05.52 hrs. CH-2 of ID fan 1B got tripped at 5:52 hrs.on 27.11.16. After CH-2 trip, the current in CH1 of ID fan 1B found raised from 480A to 629A. Load was reduced to 480 MW at 6:34 hrs and the coal flow was 278 T/hr. CH-1 current was found to be varying from 600 to 624 A.

CH-1 also got tripped on uncommanded off at 8:25:38 hrs. Since both channel got tripped, ID fan 1B got tripped. Hence FD fan 1B tripped on interlock.

Subsequently Mill H and G tripped on FD fan runback. Coal flow got reduced to 168 T/hr from 278 T/hr. Load ref was reduced from 480 mw to 352 MW in a span of 4 min duration. But actual load was 391 MW just before tripping.

SH temperature control was in auto and the attemperation flow was around 107 t/hr at 480 MW. The actual temperature was 540 deg cent. The attemperation flow was 63 T/hr when the temperature was 480 deg cent at 416 MW. SH attemperation control was taken into manual at 8:30:19 hrs and the spray flow was further reduced. Mean time the turbine got tripped on MS temperature very low and Mill 1E got tripped on logic and the coal flow further got reduced to 124 T/hr.

Immediately MDBFP auto start command processed on Turbine trip.

HP BP BPV1 got fast opened to 100% on turbine trip and got closed in 13 seconds as actual pressure was lower than the set point and remain in closed condition for another 14 seconds.

Subsequently loss of RH protection found acted as per logic which lead to Boiler trip on Master fuel trip.

From the SOE, trend and interaction with board engineers, following observations are noted.

Board engineer reduced the load from 503 MW to 480 MW when CH-2 of ID fan 1B got tripped. CH-2 of ID fan 1B was being attended by EM. Mean time CH-1 got tripped on un commanded off due to VFD logic. Immediately the board engineers started reducing the load ref as well as pressure ref simultaneously due to top 2 mills got tripped on FD fan runback and the unit was not in CMC.

During the course of action, board engineer tried to start the ID fan. Mean time the MS temperature started reducing drastically. On realizing it, board engineer took the SH

spray control in manual and given close command. By this time, the MS temperature went very low and lead to turbine trip.

Though HP BP got fast opened, it got closed as per pressure controller action. Since it remained closed for more than 10 seconds, Loss of RH protection got initiated as per the logic and lead to Boiler Trip on Master fuel trip.

CONCLUSION:

Spray flow was 107 T/hr at 480 MW which was due to more coal flow around 110 T/hr in top 2 mills. Hence on tripping top 2 mills, the temperature effect on main steam was more significant and hence it got reduced drastically to 480 deg cent though the SH spray control took control action in auto.

Since the CMC is not in service, though the top 2 Mills got tripped on runback in LP mode, rate of load reduction is found to be minimum which might have caused fast reduction in pressure and temperature. If it is in CMC the load would have come to 280 MW keeping pressure constant as the loop would have been in pressure control on runback.

Though the HP BP vlv got opened on fast open command, the vlv got closed on pressure control action due to wide difference between the MS pressure set point and actual pressure.

This lead to loss of RH protection which resulted in Boiler trip on MFT.

Boiler was lighted up at 8:57 hrs and the unit was synchronized at 10:56 hrs.

RECOMMENDATIONS:

- CMC shall be put in to service to avoid manual intervention.
- SH spray control shall be tuned to maintain the set point during run back condition.
- If run back acts on LP mode, the board engineer should reduce the load quickly maximum at the rate of 50 MW/min, monitoring the Drum level and MS temperature.

CM/ Mech DGM/Inst DGM/ Elec DGM/ Opn &Com