

TRIP ANALYSIS REPORT

TRIP ANALYSIS REPORT /4th QTR / UNIT 2 / 2017

Dt. 19-01-17

OCCURRENCE:

- (a) **Condition:** Load: **489 MW** at **8:46** hrs on **19.1.17** with 6 Mills in LP mode
- (b) **Incident:** Boiler hand tripped on Drum level very low at **08:54** hrs on 19.01.17.

OBSERVATIONS FROM SOE/ALARM PAGES AND BOARD ENGINEER

FEEDBACK:

08:47:53 hrs: TDBFP 2A Turbine front journal bearing vibration very high.

08:47:54 hrs: TDBFP 2ATrip condition present.

08:47:55 hrs: MDBFP auto start.

08:47:55 hrs: Rapid start up -93 vlv auto open.

08:47:55 hrs: Rapid start up -92 vlv auto open.

08:47:55 hrs: MDBFP AOP.

08:48:05 hrs: MDBFP failed to start in STDBY.

08:48:12 hrs: Pulveriser H trip

08:48:14 hrs: Feeder-H tripped.

08:48:18 hrs: Mill-G tripped.

08:48:20 hrs: Feeder -G tripped.

08:48:35 hrs: Furness pressure Low

08:51:23 hrs: Live steam pressure low.

08:54:28 hrs: Emergency PB pressed.

08:54:29 hrs: MFT CH3

08:54:29 hrs:MFT CH2

08:54:29 hrs: MFT CH1.

08:54:29 hrs: TP1 MFT PROT TP CH-1

ANALYSIS:

Unit was in service with a load of 489 MW in LP mode with 6 mills, coal flow 294 T/hr, Drum level -13 mm, Steam flow 1489 T/hr and Feed water flow 1569 T/hr. MDBFP 2C in auto standby mode.

TDBFP 2A got tripped at 08:47:53 due to Turbine Front journal bearing vibration high. Protection value is 75-micron p-p. Maximum vibration recorded in DCS was 106-micron p-p. at turbine speed 5515 rpm.

On tripping of TDBFP 2A, MDBFP auto start command processed immediately. Rapid start up SOV and ALOP got started. But “MDBFP failed to start in Standby” alarm came subsequently at 8:48:05.

As MDBFP was failed to start, the runback got initiated in LP mode. Hence top running mills H and F got tripped at 8:48:14 and 8:48:20 respectively.

Subsequently the board engineer started reducing the load set point from 494 MW and brought the actual load to 250 MW in the duration of 5 min to match the steam flow with Feed water flow.

During this emergency, the running TDBFP speed went from 5236 rpm to max 5472 rpm due to 100 % opening of MCV and the feed water flow got raised from 922 T/hr to 1061 T/hr to maintain the drum level in auto. Drum level protection was bypassed momentarily to save the unit and continuously monitoring the level.

The TDBFP speed started reducing as the ACV did not open when the speed controller output was greater than 50 % and also MCV opening restricted to 65% as per the logic.

This resulted in the reduction of feed water flow. Steam flow corresponding to load was more than the Feed water flow. Hence the drum level started reducing and reached the trip value. Hence Boiler was hand tripped at 8:54:20 hrs. Unit was in service for total duration of 7 minutes from TDBFP 2A trip.

Unit was lighted up at 9:35 hrs and the unit was synchronized at 12:21 hrs.

CONCLUSION:

It is concluded that TDBFP 2A trip on “Turbine Front journal bearing vibration high” was may be due to sudden opening of MCV which was observed from the trend. The reason is suspected MCV convertor piston choke.

It is concluded that “MDBFP auto start fail” was due to MTR lockout rely 86 electrical protections not reset. MDBFP-2C was started on 18.1.17 as routine checkup every week and it was stopped in 3 minutes. As per logic, to prevent subsequent motor starting within 5 min, trip relay 86 energized and it was not reset.

It is concluded that ACV did not open as the live steam pressure low alarm observed as well as speed started reducing which was due to pilot valve problem.

RECOMMENDATIONS:

- TDBFP vibration trip logic should be revised as annunciation and not included in the trip for observation and study.

- MDBFP electrical protection MTR acted signal in the DDCMIS logic to be modified to know the MTR acted condition in the permissive pop up of MDBFP.
- TDBFP logic shall be suitably modified such that MCV should not close from 100% opening to 65 % before ensuring ACV opening when the speed controller output is greater than 50%. Or Separate control will be provided for MCV (speed control) and ACV (live steam pressure control) as per the revised logic in vogue in 600 MW BHEL unit on trial basis for observation.
- Unit load should not be reduced below 290 MW in case of failure of one TDBFP without MDBFP in service to ensure sufficient Extraction live steam pressure for running TDBFP in the event of failure of ACV opening.
- Unit 11KV,3.3 KV annex staffs are advised to ensure the healthiness of all critical standby equipments and report to the board engineer every shift.
- MDBFP should run minimum 15 min duration during healthiness checking.

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