



NLC TAMILNADU POWER LIMITED
DEPARTMENTAL PROCEDURE MANUAL
(ISO 9001:2015, ISO 14001: 2015, ISO 45001: 2018& ISO:50001:2018)
STANDARD OPERATING PROCEDURE

| | | |
|--|------------------|---------------------------|
| TITLE:- SOP FOR BOILER HYDROTEST PROCEDURE | | Doc. ID: NTPL/OPRN/SOP-17 |
| Issue Date: 28-12-2018 | Revision No.: R1 | Revision Date: 15-07-2020 |

PURPOSE: Define a procedure of Boiler Hydrotest.

SCOPE: This SOP is applicable at NTPL

RESPONSIBILITY: Shift Engineer / Operation Engineer

PERFORMANCE CRITERIA:

ACTIVITIES:

1.PURPOSE OF BOILER HYDRO TEST:

- It is statutory to conduct the hydro test once in a year as per Indian boiler regulation act.
- To ensure the healthiness of the pressure parts for trouble free operation.
- The DM water make up may be kept in minimum range, as the defects are eliminated in Hydro test.

2. Criteria for Hydrotest

For conducting Hydrotest on Boiler Pressure parts which include Economiser, Drum, Waterwalls, Superheater tubes and headers and all connected link and headers upto MS Stop valve, Metal temperature plays an important role. System is considered to be ready for Hydrotest after 72 hours of Boiler stoppage followed by force cooling or MS Y-piece temperature less than 100 °C.

3. PROCEDURE FOR HYDRO TEST USING BOILER FILL PUMP FOR INITIAL FILLING:

3.1 SYSTEMS AND EQUIPMENTS NEEDED.

- Boiler water and steam circuits.
- Boiler fill pump
- Dosing System
- CWP system
- ACW system/Interconnection line
- DMCW system
- IAC system
- CST and system
- Motor driven Boiler feed pump
- Ensure sufficient quantity of water in CST.
- Ensure that no L.C is pending in the system to be started / tested.

3.2 SCHEME PREPARATION

- In MS line, the MS Strainer (MSV 105-106) drains to UFT has to be kept in open condition.



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- All turbine connected MAL drains has to be opened and diverted to flash box.
- The HP BP warm up drains (BPV 101-102) have to be kept open to UFT
- HP BP spray station BD isolation valve to be kept closed
- Close boiler stop valve (MSV 1 & 2) and its bypass valves (MSV 3&5, MSV 4&6).
- In water side drain header, Open water side drains (E20, E22, B99) connecting to boiler water side and close water side drains to IBD.
- Close all SH drains and SH drain Header to IBD Isolation.
- Close Boiler Drain Header to SH drain Header connection.
- Open Drum air vents and SH vents.
- Close MS drain (MSV 101-102) before Boiler stop valve.
- Close CBD motor operated main valve and close manual isolation.
- EBD valves (B81&82 and B 96&97) to be kept closed.
- RH drains have to be kept open.
- RH spray system shall be isolated.
- MST to AST isolation v/v should be in closed condition.
 - a) ASV-21 (MOV) & its B/P ASV-22 (AOV).
 - b) ASV-74 & its B/P ASV-75 (MOV).
- AST drain before ASV-22 to IBD, ASV-163 (HOV), ASV-164 (MOV) should be open condition.
- SH spray system isolation valves shall be opened and one side of spray control valve to be made ready for pressurization.
- Feed control station (30% and 100%) has to be kept in isolated condition
- Both series of HP heaters and its Bypass line to be isolated
- Both TDBFP source to SH spray and RH spray to be isolated
- The Deaerator initial filling to be done from Boiler Fill pump and at +300 mm Dea. filling isolation to be closed.
- Hot-well makeup station, CEP and Condensate system to be made ready for further filling of Deaerator.
- Gagging of drum Safety valves and SH safety valves to be done, in case the hydro test pressure is more than safety valve pressure
- Ammonia and Hydrazine dosing scheme to be made ready for Boiler fill pump and MDBFP

2.3. FILLING OF CONTOUR:

- Keep full open of Boiler fill pump R/C valve to CST



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- Start boiler fill pump and connect to WWDH (Water wall drain header), by slowly opening the Boiler fill pump discharge valve
- Adjust boiler fill pump R/C valve for more flow to Boiler contour filling and check at MCC (Motor Control Centre) for normal current (always <300 amp).
- Periodically check the drop in DM water tank level to ensure the filling system is healthy
- During boiler contour filling also, Inspection of boiler may be done for any abnormalities
- At +350mm of Drum level, Middle BCW to be started for proper mixing of dosing
- Close the air vents and the super heater start up vents after ensuring removal of air. (free flow of water from the air vent has to be observed)
- Close SH DH, WWDH drain valves connected to boiler side
- After closing of all air vents and drains, the drum pressure will be around 5 ksc
- Stop the boiler fill pump and close the pump discharge valve and the main isolation valve near the water side drain header. Open the recirculation valve full.

4. HYDRO TEST:

- Start Motor Driven Boiler Feed pump.
- Keep MDBFP RC valve open and Discharge valve closed.
- Confirm from UCB in charge for pressure raise.
- Charge the SH spray system and slowly rise the pressure at 3-4 Ksc /min upto 100 ksc and further @2-3 ksc/min by opening the TCV/Spray valve gradually.
- Continue the pressure rise at 2-3 ksc/min upto 140 ksc.
- Beyond 140 ksc, the rate of rise shall be 1 ksc/min.
- Reach the hydro test pressure.
- Hold at hydro test pressure as per BM requirements.
- Confirm from UCB in charge for pressure reduction, after BM clearance.
- Depressurize the system in reverse order by adjusting BFP scoop and TCV
- Inspection of boiler may be done for any abnormalities and leaks.
- Recording of the defects if any observed during inspection.
- Stop Boiler Feed pump at 70 ksc Drum pressure.
- The pressure in the system will reduce on its own in case of leakages.
- If the pressure remains healthy after stopping the boiler feed pump, open any small drain such as CBD manually by about one turn and adjust the pressure reduction such that 3-4 ksc/min.



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- Reach the drum pressure 1 ksc
- Open the air vents of drum and SH vents.
- Drain SH to IBD by opening the concerned valves.
- Depending upon the inspection report, water may/may not be drained and proceed to light up/ be diverted to IBD.(In case of light up ,scheme prepared for hydro test may be normalized both on Turbine and Boiler sides)
- Completion of hydro test.
- Remove the gagging of the safety valves. (Safety valves ready for operation)

5.0 CONTOUR WATER VOLUME DETAILS

| VOLUME IN M³ | |
|--------------------------------------|-----|
| ECONOMISER | 135 |
| DRUM | 60 |
| GENERATING SURFACE | 160 |
| SUPER HEATER (DRUM TO SHO HEADER) | 145 |
| REHEATER | 220 |
| TOTAL | 720 |

RECORDS:

| Record Title | Record No. | Location | Responsibility | Retention Time |
|---------------------|-------------------|-----------------|-----------------------|-----------------------|
| NTPL/OPRN/R-01 | | CCR | Operation Div. | 3 Years |

VERIFICATION, CORRECTIVE AND PREVENTIVE ACTION:

HOD shall ensure adequacy and implementation of the above procedure through periodic interaction with department personnel, and regular review and monitoring of the processes and compliances. In case of any observed deviation, corrective and preventive action shall be immediately undertaken.

HOD