PURPOSE: To define SOP for Boiler shutdown procedure

SCOPE: This SOP is applicable at NTPL

RESPONSIBILITY: Shift Engineer / Operation Engineer

PERFORMANCE CRITERIA

ACTIVITIES:

1. **S/D other than pressure parts and flue gas path maintenance**

Activity
Operate WB and SB before reducing load except emergency shutdown.
PRDS self-source to be isolated and to be charged from other unit.
Reduce the firing and empty the feeder one by one starting from top mill.
Below 200 MW, take HP-LP bypass in service to reduce the load and pressure and Keep HP bypass atleast 25 % open to facilitate flow through Reheater.
Take oil support if needed for lower most mills and operate RAPH soot blower
Reduce the load gradually to 100-120MW/ 70-75 Ksc with controlled firing and changeover the supply from Unit Bus to Station Bus
Open Economiser Recirculation valve and close CBD valve
Trip the boiler and start AOP for main turbine at 2850 RPM
After fast Opening of HPBP, take it in manual and close it to avoid cooling of MS-CRH lines
After tripping of Boiler, Purge the Furnace at least for 9 mins by running ID and FD, with air at a rate of 900TPH
Ensure closing of all oil valves and HOTV and Stopping of all feeders and mills.
Close HPBP-BD isolation to avoid water entry in CRH line. after closing HPBP, depressurize RH and close LPBP.
Ensure both TDBFP come to STG
Raise the TG oil temperature CV set point to 50 deg.C
Auto start/manual start JOP at 510 RPM
Auto Open/Manual Open Turning Gear Valve at 210 RPM
After purging, stop all the Fans and allow the Furnace for Natural cooling.
Ensure Natural circulation RAPH-All FG dampers will remain open. RAPH-All air side dampers will remain open. All SADC will remain open. Keep open one ID Fan IGV and I/L-O/L gate, Blade pitch and O/L gate of one FD fan. Air circulation will take place
Keep one BCW(preferably middle one) in service till suction manifold temperature <95 ^{0}C
Maintain drum level by feeding feed water and keep Drum top and bottom differential temperature not more than 50 ^{0}C

Condenser vacuum is to be maintained if TDBFP is feeding to Drum. Otherwise if MDBFP alone is running and HRH pressure becomes 0 ksc , vacuum can be killed and open RH vents and Drains
Close spray isolation for RH and SH. And open RH vents and CRH atmospheric drain
Make ESP off and run Rapping motors for 30 mins
Put the COLTCS in collection mode(Duration 45 mins). When main turbine comes on STG, After that stop one CW pump and choke one CW O\L valve 90-95 % to maintain pump discharge pressure ≈ 2.5 ksc
Drum level to be maintained (above working level) with periodic feeding and continue till BCW suction manifold comes down to 95 ^{o}C
Keep Rate of cooling from 50 ^{o}C per hour to 80 ^{o}C per hour of exit flue gas temperature by adjusting FD fan PCD
Open SH drains and vents at Drum pressure 5 ksc
Open Drum vents at Drum pressure 2 ksc
Once drum pressure is killed and suction manifold temperature falls below 95 ^{o}C , BCW pump shall be stopped and boiler contour shall be drained as per BM requirement
After draining of boiler contour, slag conveyor may be stopped.

2. **Water wall tube failure and SH & RH Steam coil puncture**

Activity
PRDS self-source to be isolated and to be charged from other unit
Reduce the firing at faster rate to avoid any secondary puncture. And stop mills one by one starting from top mill.
Below 200 MW, take HP-LP bypass in service to reduce the load and pressure and Keep HP bypass at least 25 % open to facilitate flow through Reheater.
Take oil support if needed for lower most mills.
Reduce the load gradually to 100-120MW/65-70 Ksc with controlled firing and changeover the supply from Unit Bus to Station Bus
Open Economiser Recirculation valve and close CBD valve
Trip the boiler and start AOP for main turbine at 2850 RPM
After fast opening of HPBP, take it manual and open 25 %
Ensure both TDBFP come to STG
Purge the unit at least for 9 mins by running ID and FD, with air at a rate of 900 TPH
Keep one series of ID and FD in service for cooling with maximum air flow of 900 TPH and maintain furnace vacuum of -15 to -20 mmwc
Raise the TG oil temperature CV set point to 50 deg.C
Air flow can be adjusted in order to keep Drum top and bottom differential temperature not more than 50 ^{0}C
Auto start/manual start JOP at 510 RPM
Auto Open/Manual Open Turning Gear Valve at 210 RPM
Ensure closing of all oil valves and HOTV and Stopping of all feeders and mills.
Reduce the Drum pressure to 30 ksc using HP-LP Bypass and BM to be informed to inspect entire

boiler contour including 'S' panel.
At 10 ksc Drum pressure, Close HPBP and close spary BD isolation to avoid water entry in CRH line. After closing HPBP, depressurize RH and close LPBP. Open RH vent
*In case of RH coil puncture, HRH pressure to be maintained (4-5 ksc) even after killing the vacuum. RH coil should not be connected to vacuum without pressure(to avoid flue gas entry) .
Close spray isolation for RH and SH.
Condenser vacuum is to be maintained if TDBFP is feeding to Drum. Otherwise if MDBFP alone is running and HRH pressure becomes 0 ksc , vacuum can be killed and open RH vents and Drains
Make ESP off and run Rapping motors for 30 mins
Put the COLTCS in collection mode (Duration 45 mins). When main turbine comes on STG, After that stop one CW pump and choke one CW O\L valve 90-95 % to maintain pump discharge pressure ≈ 2.5 ksc
Drum level to be maintained (above working level) with periodic feeding and continue till BCW suction manifold comes down to 95 ^{o}C
Keep one BCW(preferably middle one) in service till suction manifold temperature <95 ^{0}C
Keep Rate of cooling from 50 ^{o}C per hour to 80 ^{o}C per hour of flue gas temperature at RAPH inlet and don't stop the fans until the temperature falls below 100 ^{o}C
After 3 hours from boiler trip, open slag conveyor drain and reduce water level in slag bath to break furnace seal and maintain minimum water level.
Open furnace man-holes at 10 ML and continue the force cooling one ID-FD series and maintain furnace vacuum -20 mmwc
Open SH drains and vents at Drum pressure 5 ksc and Drum vents at 2 ksc
Once drum pressure is killed and suction manifold temperature falls below 95 ^{o}C , BCW pump can be stopped and boiler contour can be drained as per BM request
Cooling can be continued till flue gas exit temperature is cool enough to go inside for maintenance.
For SH or RH coil failure, water washing to be done by BM after stopping the Fans , only after the tube metal temperature, in the location where water washing to be done, falls below 95 deg.C
After draining of boiler contour, slag conveyor should be stopped.

RECORDS:

Record No.	Record Title	Location	Responsibility	Retention Time
NTPL/OPRN/R-01	UCB B&T LOG	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