



# NLC TAMILNADU POWER LIMITED

## DEPARTMENTAL PROCEDURE MANUAL

### STANDARD OPERATING PROCEDURE

TITLE: SOP FOR CONDENSER VACUUM PULLING

Doc. ID: NTPL/OPRN/SOP-11

**PURPOSE:** Define a procedure of Condenser Vacuum Pulling

**SCOPE:** This SOP is applicable at NTPL

**RESPONSIBILITY:** Shift Engineer / Operation Engineer

**PERFORMANCE CRITERIA:**

#### ACTIVITIES:

1. Before pulling vacuum in the condenser, the following systems should be ensured for service / isolation.
  - a. Ensure at least one CW Pump is in service with one side water box inlet valve 100% open & other side water box inlet valve slightly open (Just to ensure flow)
  - b. Ensure one ACW Pump is in service with at least one TG PHEs in service and Vacuum pump PHE in service.
  - c. Ensure one CT Pump is in service
  - d. Ensure one Instrument Air compressor is in service.
  - e. Ensure the normal water level in the separator of vacuum pumps.
  - f. Ensure At least one TG DMCW Pump is in service with at least one TG PHEs in service.
  - g. Ensure condensate inlet valve and outlet valve of GSC open and Drain condensate valve (HOV) to LP flask tank open.
  - h. Ensure At least one CEP is in service with long recirculation. Ensure hot well level is at operating level.
  - i. Ensure the Gland steam condenser atmospheric vent valve is closed and steam inlet to GSC valve open and ensure siphon is in filled condition.
  - j. Ensure one control fluid pump is in service.
  - k. Ensure Shaft turning Gear is in service.
  - l. Ensure AST PRDS HT header is in charged condition. Maintain AST Pressure: 13Ksc & temperature: 320°C If turbine is Hot condition. (i.e Max turbine metal temp>350°C) and maintain AST temp at 250 °C, if the Turbine is cold condition (i.e MMT<150°C.)
  - m. Ensure the availability of Gland Seal Exhaust Fan motor supply.
  - n. Ensure the availability of Vacuum Pump and Recirculation pump motor supply.



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- o. Ensure that the LP Flash Tank, HP Flash Tank, Steam Drain Flash Tank connected all valves in closed condition.
  - p. Ensure all Turbine drain valves (MAL) in open condition.
  - q. Ensure the seal water supply to all vacuum connected valves.
  - r. Ensure Both BFPDT Steam exhaust valve in close condition.
  - s. Ensure Both BFPDT gland steam exhaust valve in close condition.
  - t. Ensure Vacuum pump PHE is charged with cooling water(ACW).
  - u. Close CRH atmospheric drain valve (near SG DMCW).
2. Warm up the seal steam header up to MOV(MAW10AA010) before seal steam supply control valve(MAW10AA001) by opening the MOV (ASV67) at AST PRDS station, drain valve MOV(MAW10A011) and seal steam atmospheric drain valve behind HP flash tank near condenser, which is taken before seal steam supply isolation MOV (MAW10AA010) at 8.5ML. Ensure MAL-81(MOV) seal header drain open. Ensure minimum temperature before supply control valve is 240°C.
3. Ensure Seal steam supply line up to header HOV is warmed up.
4. Ensure Level High switch acting for separator tank level and local verified.
5. Start both vacuum pumps and recirculation pumps for initial pulling of condenser vacuum & ensure opening of condenser air inlet valve Air IV and pump suction SOV and closing of ejector SOV.
6. Close the vacuum breaker valve as soon as condenser pressure starts reducing. Observe the Condenser Vacuum rise in the pressure transmitter at vacuum pump suction and also in the condenser.
7. When vacuum in condenser transmitter reaches 0.9 ksc (abs), admit seal steam slowly by opening the seal steam supply control valve. This supply valve will open when the gland seal steam pressure controller command is above 50%.
8. When the seal steam header temperature reaches 100°C, start any one of the Gland seal exhaust fan and check the auto opening of corresponding inlet valve.
9. Put the seal steam supply valve in Auto mode when the actual seal steam header pressure reaches the set point of 300mbar.



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10. Observe the rise in vacuum, if it is not improving check to arrest the air ingress in to the condenser.
11. Once unit synchronised and condenser pressure comes below 0.1450 ksc(abs), stop one vacuum pump and its recirculation pump. Select that pump as standby and switch on SLC.

During running condition if condenser pressure rises above 0.155 ksc(abs), standby selection will start automatically provided SLC is on and standby selection is made.

#### 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**