



**NLC TAMILNADU POWER LIMITED**  
**DEPARTMENTAL PROCEDURE MANUAL**  
(Incorporating ISO 9001:2015, ISO 14001: 2015 & ISO 45001: 2018)

**TITLE:- SOP FOR COOLING WATER PUMP**

**Doc. ID: NTPL/OPRN/SOP-09**

**PURPOSE:** To define a procedure for Cooling Water Pump

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

**RESPONSIBILITY:** Shift Engineer / Operation Engineer

**PERFORMANCE CRITERIA:**

**ACTIVITIES:**

**1. SOP for CW Pump**

1	Ensure that all LCs and work permits are returned.
2	<ul style="list-style-type: none"><li>● Ensure CW fore Bay level is normal (1.5 meters).</li><li>● Ensure its make up water flow and</li><li>● Inform PT Plant for maintaining level</li></ul>
3	<ul style="list-style-type: none"><li>● Ensure that cooling tower Basin screens are in clean condition,</li><li>● Open all Cooling tower Up Risers valves.</li><li>● Check oil level (&gt;75%).</li></ul>
4	Avail power supply for CWP's , cooling and sealing water pumps.
5	Ensure <ul style="list-style-type: none"><li>● CWP's bearing lube oil level (75%).</li><li>● Latch should be in released condition.</li><li>● Cooling line valves to lube oil and motor should be open.</li><li>● Cleanliness of CWP's suction filter.</li><li>● Ensure the gates in the CWP suction pit and Cooling tower basin are in lifted condition and Strainers are in inserted condition</li></ul>
6	Open <ul style="list-style-type: none"><li>● Air vent near CW discharge valve manually.</li><li>● All 4 vents of condenser front and rear water box.</li><li>● Condenser inlet valves fully and outlet valves by 50%.</li></ul>
7.	Close <ul style="list-style-type: none"><li>● Inlet line drains near condenser.</li><li>● Condenser water box drains.</li></ul>
8	Ensure <ul style="list-style-type: none"><li>● CWP's discharge valve in closed condition.</li><li>●</li></ul>
9	<b>Start procedure</b> <ul style="list-style-type: none"><li>● Start the seal water pump and cooling water pump 5 min before starting CWP.</li><li>● Observe the Header pressure.</li></ul> Seal water pump discharge pressure-2.5 Ksc Cooling water pump discharge -3 ksc Cooling water line pressure to motor brg 1.5 ksc



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	Cooling water line pressure to pump brg 1 ksc.
10	<p>Ensure availability of all <b>start Permissive</b> of CWP, which are</p> <ol style="list-style-type: none"> <li>1. Condenser inlet and outlet valves are open.</li> <li>2. CW pump discharge valve is closed.</li> <li>3. Motor winding temperature is not high.</li> <li>4. Motor/pump bearing temperature DE/NDE is not high.</li> <li>5. Fore bay level is not low .</li> <li>6. Thrust bearing cooling water flow is not low.</li> <li>7. No reverse rotation.</li> <li>8. Switch gear available.</li> <li>9. Emergency push button not operated.</li> </ol>
12	Start the CW pump from PLC terminal at pump house.
13	After starting CWP, immediately open discharge valve by 10%.
14	Close all the air vents after air release.
15	Check the discharge pressure and further open discharge valve to bring down the discharge pressure around 2.5 Ksc.
16	Gradually Open the discharge valve fully.
17	<p>Observe the Pump discharge pressure, Water box inlet and outlet pressure, Debris filter diff pressure, Bearing temperature of pump and motor, winding temperature and current of motor, and fore-bay level.</p> <p>Pump discharge pressure approx. 2.5 ksc  Water box inlet pressure 1.85 ksc  Water box outlet pressure 1.3 ksc  Debris diff pressure 50 mbar  Motor DE/NDE temperature &lt;85 deg centigrade (Trip 95 Deg cent)  Motor Winding temperature &lt;110 deg cent (Trip 120 deg cent)  Pump brg. temperature &lt;100 deg cent (Trip 110 deg cent)  Motor full load current 220 A  Fore bay level low ( -2 m).  Fore bay level trip value (-3.5m)</p>

**Protections:**

1	Any pump bearing or thrust bearing temperature is very high (85).
2	Motor winding temperature is very high (120).
3	Fore bay level is very low (-3.5m).
4	Emergency stop push button is operated.



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5	CWP discharge pressure is very high for a sustained period of <b>90</b> seconds .
6	Pump/motor vibration is very high ( <b>20 mic</b> ).
7	Any electrical trip condition.

## **2. SOP of ACW**

1	Ensure <ul style="list-style-type: none"><li>That all work permits and LCs are returned.</li><li>At least 1 CWP is in service.</li></ul>
2	Avail power supply for ACW.
3	Ensure availability of all <b>start Permissive</b> of pumps, which are <ol style="list-style-type: none"><li>Suction pressure not low (<b>0.7 Ksc</b>).</li><li>Switch gear not disturbed.</li><li>Pump not tripped.</li></ol>
4	Open air vents near pump, PHE, and supply line for vacuum pump.
5	<ul style="list-style-type: none"><li>Open inlet, outlet of ACW and PHE.</li><li>Close all water drains.</li></ul>
6	<b><u>Start the pump and other pump may be selected as standby as per need. Monitor the pump parameters.</u></b>
7	Close air vents after air release.

## **Protections**

1	Suction pressure low (0.7 Ksc).
2	Discharge pressure high (3.6 Ksc).
3	Discharge header pressure very high and pump on (5 Ksc).
4	Discharge header pressure low (0.95 Ksc).
5	ACW Pump MCC disturbance.

## **3.SOP of DMCW Pump**

1	Ensure <ul style="list-style-type: none"><li>That all work permits and LCs are returned.</li><li>Hot well make up pump is in service.</li></ul>
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	<ul style="list-style-type: none"> <li>• Adequate DMCW Overhead tank level and its makeup valve auto open/close operation.</li> <li>• Latch to be released.</li> <li>• ACW pump is in service.</li> </ul>
2	Avail Power supply of DMCW Pumps.
3	<p>Ensure availability of all <b><u>Start Permissive</u></b> of pump, which are</p> <ol style="list-style-type: none"> <li>1. Master relay not tripped.</li> <li>2. Switch gear available.</li> <li>3. Switch gear not disturbance.</li> <li>4. Motor bearing temperature not high (90).</li> <li>5. Motor winding temperature not high (85).</li> <li>6. Pump not tripped.</li> <li>7. Suction valve not opened.</li> <li>8. Suction header pressure adequate (1.67 Ksc).</li> <li>9. Overhead tank level adequate (1000 mm).</li> <li>10. Pump off</li> <li>11. Suction pressure not low (1.25 Ksc).</li> </ol>
4	<p>Open (For both)</p> <ul style="list-style-type: none"> <li>• Air Vents in pump line.</li> <li>• Air vents near PHE.</li> <li>• Air vents in the supply line to various equipments.</li> </ul>
5	Open suction and valve of pumps and Inlet and Outlet of PHE.
6	<p><b><u>Start the pump and other pump may be selected as standby as per need.</u></b></p> <p><b><u>Monitor the pump's parameters.</u></b></p>
7	Close air vents after air release.

**Protections:**

1	Suction valve not opened.
2	Master relay operated.
3	Suction pressure very low (1.25 Ksc).
4	Motor winding temperature very high (95).
5	Discharge pressure high (6 Ksc, with a delay of 10 seconds).
6	Discharge header pressure very high (8.5 Ksc, with a delay of 10 seconds).



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**RECORDS:**

Record Title	Record No.	Location	Responsibility	Retention Time

**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**