OPTION CHECKLIST NO.4: COOLING TOWERS

| |
|---|
| • Follow manufacturer's recommended clearances around cooling towers and relocate or modify structures that interfere with the air intake or exhaust. |
| • Optimise cooling tower fan blade angle on a seasonal and/or load basis. |
| • Correct excessive and/or uneven fan blade tip clearance and poor fan balance. |
| • On old counter-flow cooling towers, replace old spray type nozzles with new square spray ABS practically non-clogging nozzles. |
| • Replace splash bars with self-extinguishing PVC cellular film fill. |
| • Install new nozzles to obtain a more uniform water pattern |
| • Periodically clean plugged cooling tower distribution nozzles. |
| • Balance flow to cooling tower hot water basins. |
| • Cover hot water basins to minimise algae growth that contributes to fouling. |
| • Optimise blow down flow rate, as per COC limit. |
| • Replace slat type drift eliminators with low pressure drop, self extinguishing, PVC cellular units. |
| • Restrict flows through large loads to design values. |
| • Segregate high heat loads like furnaces, air compressors, DG sets, and isolate cooling towers for sensitive applications like A/C plants, condensers of captive power plant etc. A 1oC cooling water temperature increase may increase A/C compressor kW by 2.7%. A 1oC drop in cooling water temperature can give a heat rate saving of 5 kCal/kWh in a thermal power plant. |
| • Monitor L/G ratio, CW flow rates w.r.t. design as well as seasonal variations. It would help to increase water load during summer and times when approach is high and increase air flow during monsoon times and when approach is narrow. |
| • Monitor approach, effectiveness and cooling capacity for continuous optimisation efforts, as per seasonal variations as well as load side variations. |
| • Consider COC improvement measures for water savings. |
| • Consider energy efficient FRP blade adoption for fan energy savings. |
| • Consider possible improvements on CW pumps w.r.t. efficiency improvement. |
| • Control cooling tower fans based on leaving water temperatures especially in case of small units. |

方案列表4: 冷却塔

| |
|---|
| • 根据制造商建议的方法，对冷却塔进行检查，重新定位或改进妨碍进气和排气的结构。 |
| • 根据季节和负荷变化，优化冷却塔风机叶片角度。 |
| • 更正过大的和/或不平衡的风机叶梢间隙以及风机不平衡现象。 |
| • 在旧的逆流式冷却塔，用新的方形ABS塑料防阻塞喷嘴代替旧的喷嘴。 |
| • 用自熄性PVC蜂窝状薄膜填充装置替代搅棒。 |
| • 安装新的喷嘴，以取得更统一的水样。 |
| • 定期清理堵塞的冷却塔配水喷口。 |
| • 平衡流入冷却塔热水池的水流。 |
| • 覆盖热水池，以抑制造成污垢的水藻生长。 |
| • 在COC聚合物的极限内，优化排水速率。 |
| • 用低压降、自熄式PVC蜂窝单元取代平板式漂浮物清除器。 |
| • 将大负荷状态下的水流限制在设计值之内。 |
| • 隔离窑炉、空压机、DG型多级离心泵等高热负荷设备和冷却塔，以保护交流设备、动力车间的冷凝器等敏感的设备。冷却水温度每升高1oC，就会使交流压缩机负荷增加2.7%。冷却水温度每降低1oC，就使热电厂的热消耗率降低5 kCal/kWh。 |
| • 监控L/G比率，设计的CW流速以及季节变化。在夏季和入口较大时增加水量，在季风期间和入口较小时增加空气流量，这对于冷却塔正常运行是有帮助的。 |
| • 监控季节变化和负荷端变化给冷却塔改进的方法、效果和冷却能力带来大额变化。 |
| • 考虑通过改进COC聚合物节约水资源。 |
| • 考虑采用节能型玻璃钢叶片以节约能源。 |
| • 考虑CW磁力漩涡泵是否有可能进行能源效率改进。 |
| • 根据排出水的温度控制冷却塔风机，尤其是在小型单元。 |