

Hybrid Wet-Dry Cooling for ACCs

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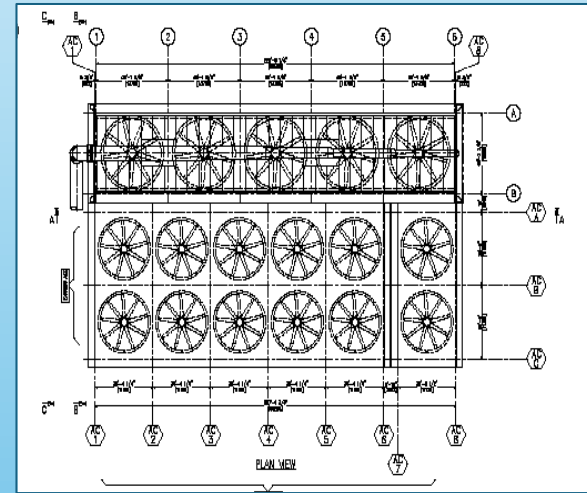
Clarksville, TN

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Options to resolve poor vacuum in ACC → MW loss

Partial resolution: actions that will improve vacuum but cannot completely resolve

- reduce air in-leakage / plug gaps
- increase ACC size with additional rows
- increase fan speed
- reduce effects of wind on fans
- routine fin cleaning

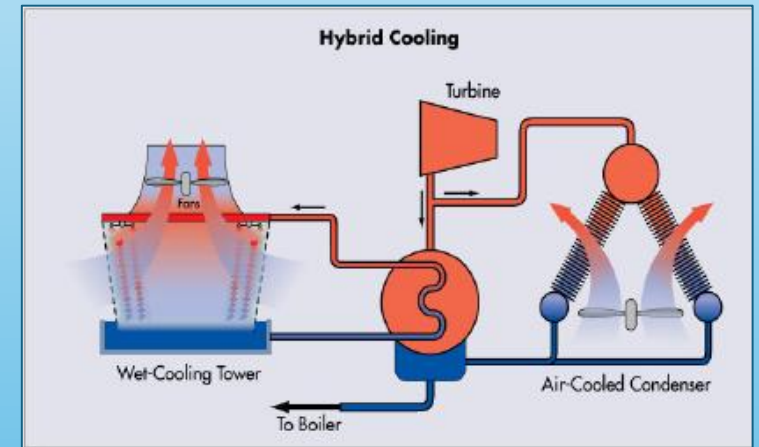
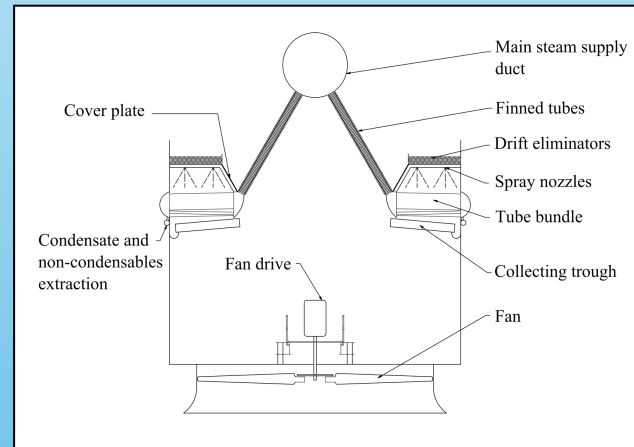


While ‘partial resolution’ issues cannot in themselves provide full generating capacity in hot weather, those that have a significant influence on performance degradation may very well be cost-effective to implement.

Options to resolve poor vacuum in ACC → MW loss

Complete resolution: appropriate application of evaporative cooling support

- water misting
- parallel cooling with water-cooled condenser
- deluge system



Note: ‘complete resolution’ requires that ‘marginal resolution’ issues are adequately addressed, particularly those that have a significant influence on performance degradation.

Water Misting

Seems simple but is challenging to optimize effectively

- some droplets collect on fan blades and are thrown to the shroud then to ground
- water must be high purity to avoid solids building up on fins

Outcome: inefficient use of expensive water with upstream misting

- application has been primarily for very limited use per availability requirements

Prospects: potential for improved application

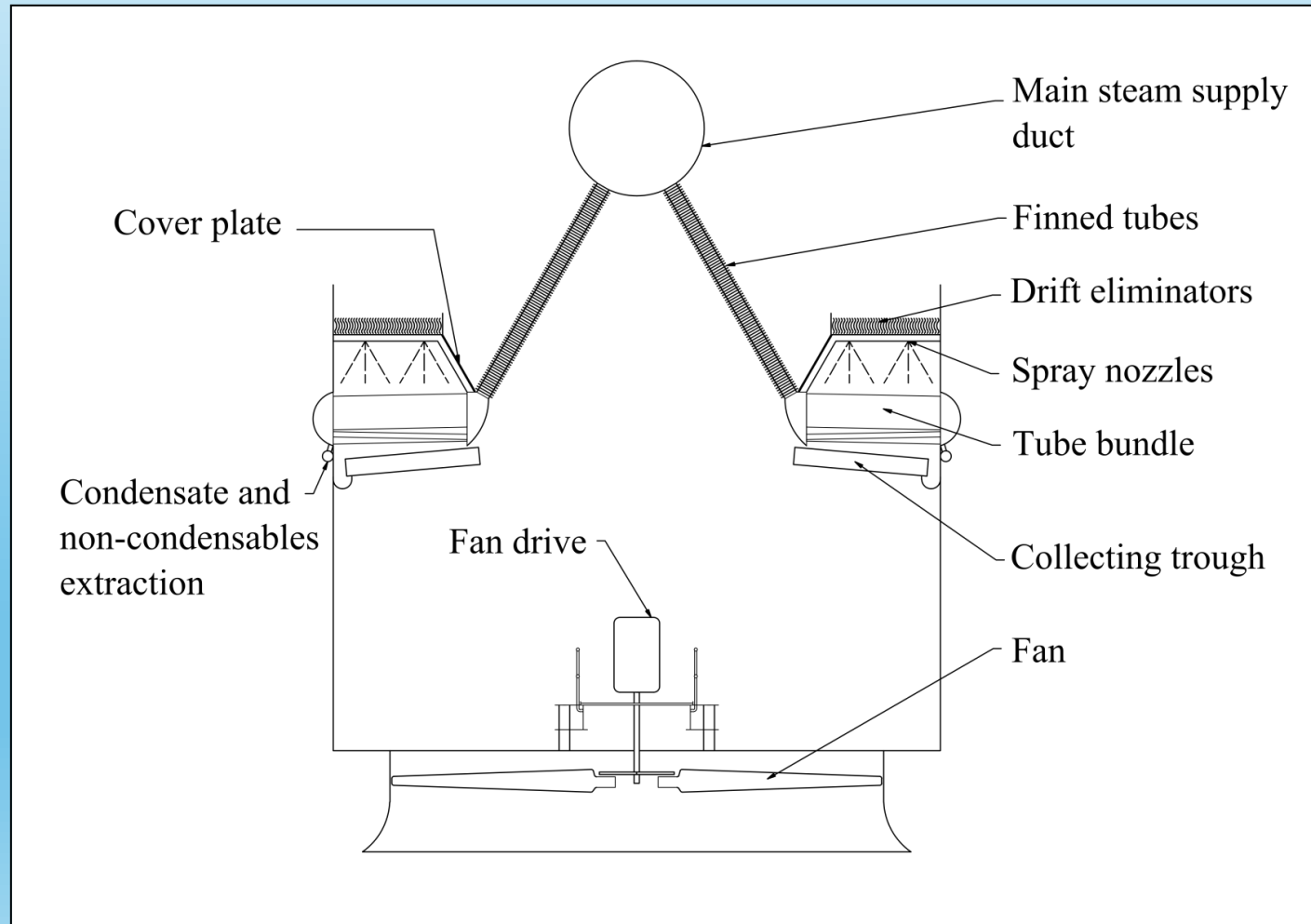
- improvements in applying the mist (droplets) for more complete evaporative cooling
- consider feasibility of lower purity water

Misting upstream of fans



Deluge Cooling

Not yet proven in full-scale application but further commercial development could improve feasibility.



Parallel Wet-Dry Cooling: Original Construction

Proven technology for both original construction and retrofit.

- Low water-use for hot days with risk of generation loss



Parallel Wet-Dry Cooling: Retrofit

Proven technology for both original construction and retrofit.

- Low water-use for hot days with risk of generation loss



Summary

- Applying misting to the upstream side of ACC fans has not proven an efficient use of very costly water. While it is possible that the evaporation inefficiencies might be overcome, it is worthwhile to examine possible benefits from supplying mist to the downstream side of ACC fans.
- Issues that may be obstacles to effective downstream application of misting should be carefully evaluated to optimize design; ideally, this approach and associated issues (e.g. scaling) should be tested on a pilot-scale in an operating ACC.

Discussion / Questions