Case Study

Filter House & Evaporative Cooler Upgrade

Phoenix, Arizona

The site had two (2) 55.0 MW Westinghouse 501AA units that were installed in the early 1970s.

The Phoenix area is very dry and temperatures in the summer can reach 120°F and the average is 75°F.

Problem

The evaporative cooling systems on both gas turbines were in disrepair and did not allow for the reliable operation of the turbines. Due to a new contract, these units would have to run in order for the customer to meet the contract requirements.

The hot summer temperatures in Arizona significantly reduced the maximum output and the customer wanted to recover this lost capacity.

The operator approached AAF as world leaders in gas turbine inlet filtration and cooling solutions looking to upgrade the filter house and inlet cooling system.
Solution

AAF designed a dual inlet system including Merv 14 level filtration, evaporative cooling and silencing to meet the requirements of the customer specification. The evaporative coolers incorporated a recirculating design and a fully automated blowdown and make-up water system. The recirculation pump and associated valves and instrumentation was packaged into a self-contained module for full shop assembly and testing. The overall inlet design was customized to closely match customer’s existing footprint to avoid foundation re-design. AAF provided both equipment supply and demolition/installation services to provide a single source turnkey solution.

Successful Outcome

The evaporative cooler is operating at its 90% design efficiency. Under maximum case ambient temperature and relative humidity levels, the additional mass air flow due to cooling results in near ISO performance, and a power gain of 17% versus ambient. The increased filtration efficiency will also provide a long term reduction in fouling of the axial compressor, further improving engine performance. Project success resulted in this same solution to be selected for use at customer’s two other Arizona 501AA sites.
Quality, expertise and innovation

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