Power station dry cooling

The Heller alternative

As the demand for electricity rises inexorably, throughout Australia plans are being dusted off for new power stations. Most of these will be constructed at inland sites, causing much of the planning effort to be directed towards securing adequate supplies of cooling water, and finding an acceptable way to dispose of the salt-rich wastewater from the cooling towers—the blowdown.

There is an alternative, dry cooling, and around the world many power station developers are adopting this technology, Australia included, if only to speed up development approvals processes. The technology continues to advance and options are increasing, to the point where dry cooling may often be favoured on economic grounds, particularly if realistic prices are assigned to the water consumed by evaporative cooling systems.

Most familiar is the direct air-cooled condenser. Less so is the Heller System, despite its having a number of features sufficient to warrant serious consideration by the developers and designers of power plants of all sizes.

This paper briefly reviews the issues involved in selecting power plant cooling systems and the alternatives available. Emphasis, however, is on the Heller System. The writer had the opportunity to visit a number of significant installations of Heller systems in Turkey and Hungary in late June 2001, and these are described.

Most of the energy we use to run our cars and other forms of transport, and to fuel our power stations, derives from the fossil fuels: coal, oil and gas, and uranium. This situation will persist for decades, even should fairly aggressive strategies be implemented for switching to renewables-based energy systems. Central to fossil fuel utilisation are heat engines: internal combustion, gas turbines and steam turbines; these last still the power industry's workhorses. Steam generated at perhaps 200 times atmospheric pressure in a boiler enters the turbine and does useful work (turns the turbine rotor) as it expands through it until it ultimately exhausts at only one-tenth atmospheric pressure, ie. conditions of high vacuum.

The problem of waste heat

The trouble is, even after it has expanded through the turbine and cooled to little more than the temperature of a hot summer day, this steam is still steam, so it still contains more than half the total heat absorbed by the water fed to the boiler. The steam needs to be condensed

Please request the full paper from richard@hunwickconsultants.com.au