

# Innovative Heat Recovery Method Earns U.S. Patent

## The U.S. Patent and Trademark

Office awarded POWER Engineers, Inc. (POWER) a patent for its innovative heat recovery method of recovering energy from hot geothermal fluids and converting the energy to electricity. POWER developed the heat recovery method to optimize energy recovery from the particular kind of geothermal fluids found in Turkey, where geothermal fluids—though energy-rich and readily accessible through wells—

characteristically contain a high proportion of gases that can complicate the extraction of heat energy if a conventional geothermal steam cycle is used.

“The POWER approach partitions the two species of fluids—the non-condensable gases and the condensable water/vapor fraction—so that energy can be harvested from each fluid type in an efficient and appropriate way,” says POWER’s Senior Project Manager Kevin Wallace.

The process, developed and patented by POWER, allows the timely and economic development of geothermal resources on projects around the world.

POWER applied the heat recovery technology at the Kizildere Geothermal

Plant in Turkey, a plant developed by Zorlu Energy, a Turkish contractor and industrial holding company. The Kizildere Geothermal Plant is the largest geothermal project in Turkey and the most advanced geothermal flash plant in the world. The Kizildere geothermal site, near Denizli, is a prominent geothermal prospect site because of its location in the Menderes Graben area of Anatolia, a geological feature famous for containing prodigious and relatively accessible hydrothermal resources potentially useful for geothermal power generation.

POWER, with the assistance of a resource/drilling consultant (Geologica) and a wellfield piping consultant (Veizades and Associates), was engaged by Zorlu to conduct a feasibility study exploring costs and technology options for developing the new plant, which already hosts a venerable and smaller (15-MW) flash geothermal plant. The feasibility study evaluated options for geothermal power generation cycle technology, ultimately finding that the patented flash-cycle approach would optimize power generation in Kizildere. In total, the Kizildere plant has a capacity of 75 MW, 60 MW of conventional flash and 15 MW of binary bottoming cycle. ■



The POWER patented heat recovery method is used to recover hot geothermal fluids and convert energy to electricity at the Kizildere geothermal plant in Turkey.