Enhanced Geothermal Potential of South Bossier Parish, Louisiana

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ABSTRACT

Geothermal energy is a cost effective, environmentally friendly source of electricity. Hot water deep below the surface is pumped to the surface and is passed through a heat exchanger with a secondary fluid, which has a much lower boiling point than water. Heat from the ground water causes the secondary fluid to flash to vapor, which drives the turbines producing environmentally friendly renewable energy. Northwest Louisiana is an area of high crustal heat flow, >82 mW/m2. High basal heat flow is most likely associated with radiogenic heat production from accreted crust of the Sabine Uplift. Heat flow also may be focused into areas around salt structures of the North Louisiana Salt Basin due to the high thermal conductivity of salt. Thus, elevated temperature gradients are expected. Bossier Parish, Louisiana, has been an active area of petroleum exploration and production since the 1930s. Large quantities of petrophysical data are available. Corrected bottom hole temperatures (BHT) derived from headers from over 120 well logs located in four large oil and gas fields within the region were used to estimate a local geothermal gradient of 4°C/km. Thus, the target zone for geothermal of greater than 120°C is within the Lower Cotton Valley Formation at a depth of approximately 12,000 ft. Well log information is used to determine the thickness and later extent of sands to determine the potential geothermal energy in the region.

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