GEOTHERMAL PRE-FEASIBILITY STUDY IN THE PHETCHABUN AREA OF NORTHERN THAILAND

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Four hot spring areas, located at Ban Nam Ron, Ban Pu Toei, Ban Pu Kham and Ban Wang Kham are to be found in Phetchabun province, approximately 350 km northeast of Bangkok, Thailand (Fig. 1). The surface temperatures range from 35 - 47 C with generally small discharges. The hot springs have been used by local villagers for a long time without any systematic investigations to assess these indigenous energy resources. Systematic studies were carried out with the objective in mind that the geothermal energy system showing the highest potential could be selected for further exploration drilling. These studies included geologic, geophysic (resistivity) and geochemical work. The geological work included field mapping, petrographic studies and fracture analysis with the compilation of a 1:15,000 geologic map and cross-section. Schlumberger profiling and depth sounding resistivity survey, covering a distance of 105 km, were carried out and the results presented as isoresistivity contour maps. Water samples, in the form of both groundwater and hot spring water, were collected and analysed. Subsurface temperatures of the systems, using conventional geothermometers, were calculated and are presented. The Phetchabun geothermal system is principally a fracture-controlled system (Fig. 2) and is classified as a low - enthalpy system with subsurface temperatures at around 120 C. The potential uses are therefore restricted to direct uses. Comparing the potential energy resources of the four areas studied, no significant differences could be recognized. Consequently, socio - economic factors become the main criteria used in selecting the highest potential geothermal system for further drilling programmes. Pu Kham hot spring, as the most easily accessible, densely populated, and with its easy availability of agricultural products, is considered to be the most viable for exploration drilling to a proposed maximum depth of 100 m (Fig. 3 and 4). The proposed exploration well should encounter hot water upflowing along fractured zones at a depth of not more than 100 m. The potential uses will then depend on the temperature and discharge quantity of the hot water encountered.

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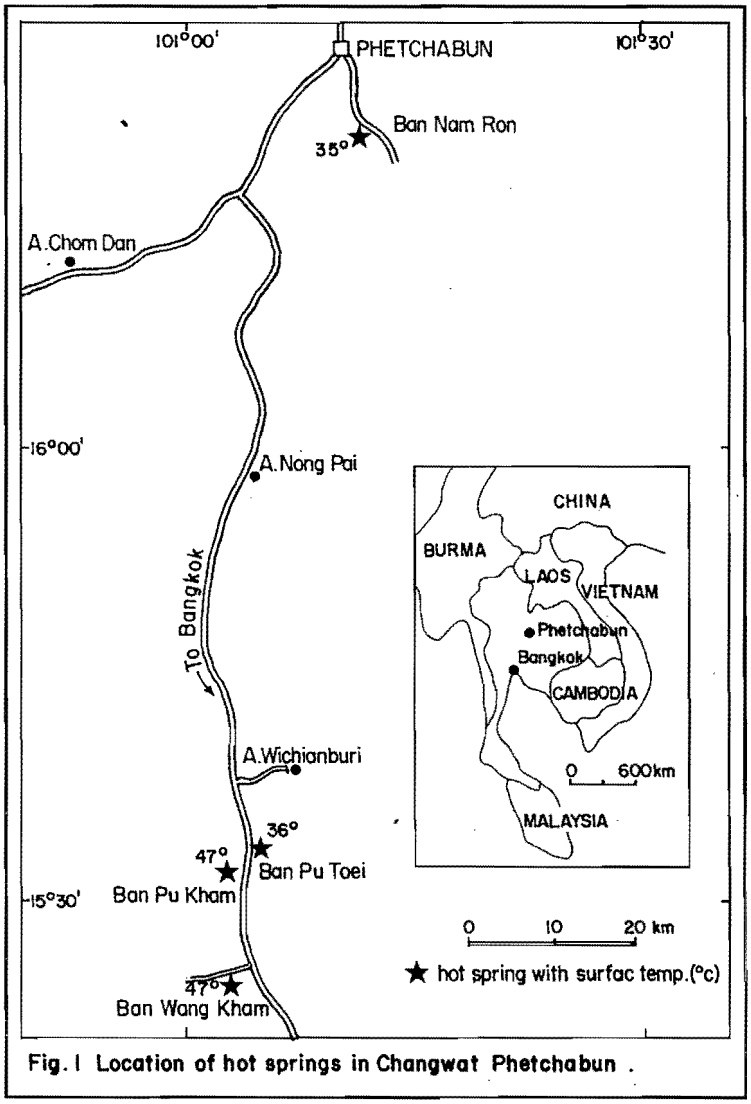

Fig. 1 Location of hot springs in Changwat Phetchabun .

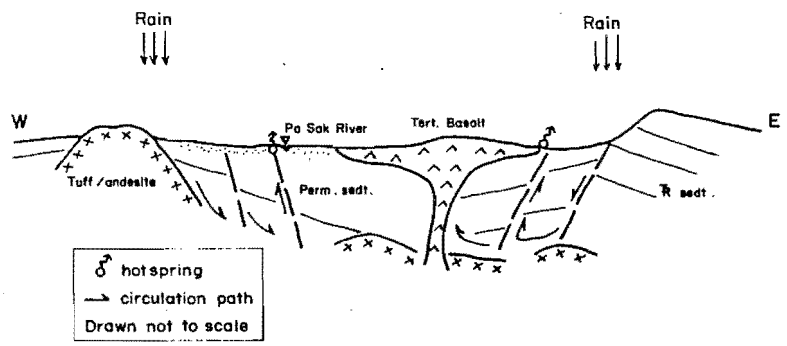

Fig.2 Hypothetical section to demonstrate the occurrences of hotsprings in the vicinity of Phetchabun .

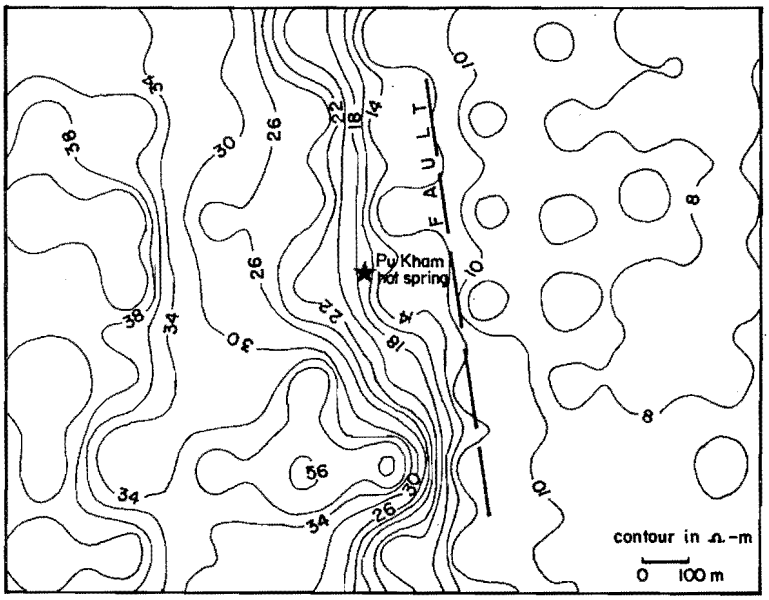

Fig. 3 Isoresistivity contour map in the vicinity of Ban Pu Kham geothermal system .

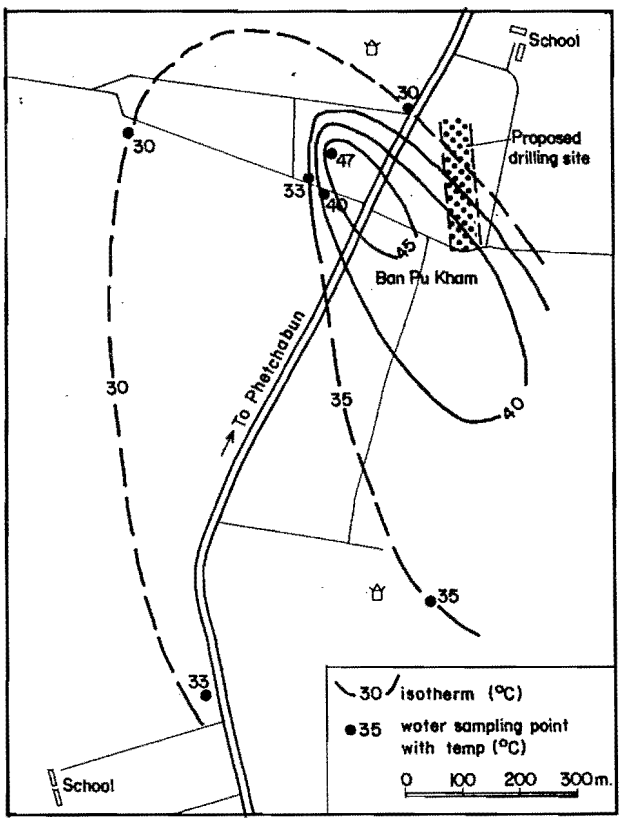

Fig. 4 Isotherm distribution and the prorosed drilling site at Ban Pu Kham geothermal system .