

## **THE STRUCTURAL CONTROLS OF THE BLACK WARRIOR GEOTHERMAL SYSTEM, TRUCKEE RANGE, NEVADA, USA**

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The Black Warrior geothermal system lies 66 km northeast of Reno, in the Truckee Range of northwestern Nevada. It is an amagmatic and blind geothermal system, because it likely lacks a magmatic heat source and hydrothermal surface manifestations (no fumaroles, hot springs, sinter deposits, or high temperature alteration). Explanation for the blindness of the geothermal system is uncertain, as research is ongoing (i.e. system has a clay cap; faults are sealed in the shallow subsurface preventing upflow and formation of hot springs; system is mostly dry). The thermal anomaly – as discovered by shallow test drilling (100-600 m, 128°C) and observed with 2-m shallow temperature survey – resides in a structurally complex zone. Detailed geologic mapping (1:24,000 scale) near the thermal anomaly has identified faults and stratigraphic relationships between successive and interfingering Tertiary volcanic sequences that dominate the landscape and overlie Mesozoic plutonic and metamorphic basement. The major faults are NNE-striking, W-dipping normal faults that terminate and step in the vicinity of the thermal anomaly. This suggests two possible favorable structural settings: (1) a fault step-over in a broad left-step of the major normal faults, whereby many closely-spaced minor faults provide hard linkage at depth and a zone of high fracture permeability; or (2) a fault termination of the southeastern rangefront fault with accompanying horse-tailing producing an area with abundant closely spaced faults and high fracture permeability. Slip and dilation tendency analyses will determine which faults are critically-stressed and permit assessment of fracture permeability and reservoir fluid flow.

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