

A Raton Basin Geothermal Prospect

Hal H. Macartney and Colin R. O'Farrell

Pioneer Natural Resources USA, Inc., Denver, CO.

The Raton Basin of southern Colorado and northeastern New Mexico is a geothermal anomaly with temperature gradients of greater than 3degF/100 ft evident from bottom hole temperature data. The anomaly spans much of the basin, with projected temperatures of 300 degF at 8000 ft depth over more than 350 square miles. This anomaly presents an attractive target for an Enhanced Geothermal System (EGS), where water is circulated through hydraulically fractured rock to extract heat and then through surface facilities to generate power. Its broad extent could provide either a substantial single generation source or multiple, smaller, distributed sources. The Raton location is appealing because it would be one of the first such projects in a sedimentary basin rather than conventional hydrothermal sites localized in crystalline basement. Success here could translate to many other hot sedimentary locations across the United States.

The anomaly is close to the city of Trinidad, to electric infrastructure along the I-25 corridor, and across La Veta Pass to the North, and close to a ready water source in the form of produced fluids from local coal-bed methane operations. Pioneer Natural Resources USA, Inc. has extensive drilling and hydraulic fracturing experience, equipment, and personnel in the vicinity, as well as a large land position. Pioneer has prepared a plan for an EGS pilot project and is undertaking feasibility analysis and preparing research proposals for funding from the DOE. The proposed Wet Canyon site is on an existing pad about 20 miles west of Trinidad, adjacent to a water injection well, and on land to which Pioneer owns all surface and mineral rights. Further, the site is near a power line for potential power export and near a gas compressor station for potential local power consumption as a substitute for fuel gas. The project itself would consist of an injector-producer pair of boreholes, surface cooler/generation facilities, fluid pumps, and an array of microseismic monitoring holes to measure reservoir fracture operations and potentially induced seismicity.

The pilot's purpose is to evaluate the subsurface risk of the EGS concept: resource assessment, effective fracture treatment, water management, and sustained heat harvesting. Results from the pilot would provide rare and much needed calibration for geothermal and economic models, and practical experience to validate the EGS process. Potential partners in the project are the DOE, the State of Colorado (through the Colorado Geological Survey), the Colorado School of Mines, and Global Carbon Solutions on the power generation side.