
Geothermal Resource Assessment of the Gueydan Salt Dome and the Adjacent Southeast Gueydan Field, Vermilion Parish, Louisiana

Taylor A. Gray and Jeffrey A. Nunn

Department of Geology and Geophysics, Louisiana State University,
E235 Howe-Russell Complex, Baton Rouge, Louisiana 70803

ABSTRACT

The high thermal conductivity and vertical geometry of salt domes in South Louisiana have the potential to be an economic source of geothermal energy. The Gueydan Dome is a piercement salt diapir in southwest Louisiana lying along the Vermilion and Acadia parish border. The shallowest salt encountered is at a depth of 1,475 m (4,839 ft), and the surrounding strata are Cenozoic sand and clay deposits. Corrected bottom hole temperatures at the crest of the dome are 62°C (144°F) recorded at 1,346 m (4,416 ft), which are too cold to drive turbines to generate electricity. Previous geothermal assessments in the vicinity conducted by Gruy Federal in 1978 selected deeper prospect locations off the east and south flanks of the dome in the *Miogypsinoides* sand. This study assesses the saline saturated *Camerina* A sand to the southwest of the dome where existing wells are shut in. Corrected formation temperatures for the *Camerina* A are between 129 and 160°C (264-320°F) at an average depth of 4,360 m (14,300 ft). Numerical modeling and a temperature depth slice interpreted from well data indicates that the salt does not increase temperatures for the *Camerina* A and regionally depresses isotherms because heat transport is focused upward through the dome. However, an increase in the geothermal gradient at the top of geopressure increases the heat content of the *Camerina* A. Limited well control to the north and west requires conservative volumetric estimates. Therefore, the *Camerina* A of Southeast Gueydan Field is not a potential prospect for a geothermal plant to generate electricity based on estimated minimum bulk volumetric requirements below the cutoff of approximately 1 km³ (0.25 mi³) (Griggs, 2004). Numerical modeling suggests that focusing of heat transport by salt structures is most beneficial to geothermal prospects when the crest of the dome is within the 100°C to 120°C (212-428°F) range of the regional temperature regime.

Gray, T. A., and J. A. Nunn, 2010, Geothermal resource assessment of the Gueydan Salt Dome and the adjacent Southeast Gueydan Field, Vermilion Parish, Louisiana: Gulf Coast Association of Geological Societies Transactions, v. 60, p. 307-323.