# GEOPRESSURED GEOTHERMAL PROSPECTS IN THE FRIO FORMATION OF THE TEXAS GULF COAST—IDEAL VS. ACTUAL MODELS

D.G. Bebout[1] and R.G. Loucks[1]

## ABSTRACT

The Bureau of Economic Geology, University of Texas at Austin, has been searching for geopressured geothermal prospects in the downdip portion of several offlapping, basinward-thickening wedges of Tertiary sand and shale along the Texas Gulf Coast. The ideal prospect model is a reservoir with a volume of at least three cubic miles (which translates into a cumulative sand thickness of greater than 300 feet and areal extent of 50 square miles), greater than 250° F uncorrected subsurface fluid temperature, permeability greater than 20 millidarcies, and water saturated with methane.

Three geothermal prospects have been identified in the Frio Formation—the Armstrong, Nueces, and Brazoria prospects; these three represent the actual models. The sand bodies in these models range in cumulative thickness from 200 to 600 feet and each extends over an area of greater than 50 square miles, with the exception of the Brazoria area where the sands may have more limited areal extent. In the prospective reservoirs the fluid temperature ranges from a marginal 250° F to at least 330° F. Sparse core analyses from above and below the potential geothermal reservoirs indicate that permeability of 18-20 millidarcies occurs at 11,000 - 12,000 feet with 250° F fluid temperature; permeabilities are considerably lower in the deeper, hotter reservoirs. Therefore, permeability is a major limiting factor in identifying a geothermal prospect.

Actual prospects identified thus far do not meet all of the requirements of the ideal geopressured geothermal model. Enormous reservoirs extending over hundreds of square miles with hundreds of millidarcies permeability predicted by previous workers have not been found in the geopressured zone of the Frio. However, initial studies indicate that the smaller reservoirs which are being delineated are capable of producing significant quantities of thermal energy and methane.

---

[1]Bureau of Economic Geology, The University of Texas, Austin, Texas