

JONES, MICHAEL L., Department of Geosciences, Texas Tech University, Lubbock, Texas 79409, SEIICHI NAGIHARA, Department of Geosciences, Texas Tech University, Lubbock, Texas 79409, and MICHAEL A. SMITH, Minerals Management Service – Gulf of Mexico Region, New Orleans, Louisiana 70123

### **The Regional Geothermal heat flow regime of the North-Central Gulf of Mexico Continental Slope**

Eighty-eight oil and gas wells in the Texas-Louisiana continental slope were analyzed to obtain heat flow and geothermal gradient values. Heat flow values at 55 of these wells were determined in order to provide a basis for modeling hydrocarbon maturity. The geothermal gradient was calculated for all wells. Heat flow was obtained as the product of the geothermal gradient and thermal conductivity of the sediments. The thermal gradient was obtained from bottom-hole temperatures (BHTs). The Horner plot method was used to correct BHTs when there were multiple measurements obtained at the same depth but different times. For single measurements, a correction scheme that utilizes the relationship between temperature, depth and shut-in time was used. The conductivity was estimated from petrophysical logs by a two-step procedure: first, determining lithology using a volume of shale calculation and then calculating the bulk conductivity using the geometric mean law. Radiogenic heat production within the sediments was constrained at some of the wells using natural gamma spectrometer (NGS) logs. A method, which utilizes the relationship between the total gamma ray log and heat production, was used for the other wells.

The heat flow values from this study and heat flow probe data obtained previously show regional trends that appear to be influenced by two factors: accumulation rate of recent sediments and proximity to diapiric salt structures. High sedimentation rates in the Mississippi submarine fan have suppressed surface heat flow. Salt domes in the upper continental slope elevate heat flow, but the presence of laterally continuous salt sheets appears to have little effect on heat flow.