
A Preliminary Examination of Geothermal Gradient throughout Louisiana's 64 Parishes

Douglas Carlson and Richard P. McCulloh

Louisiana Geological Survey, 3079 Energy, Coast and Environment Bldg.,
Louisiana State University, Baton Rouge, LA 70803

ABSTRACT

This appears to be the first comprehensive examination of geothermal gradient throughout all of Louisiana's 64 parishes. In the past, studies were focused on only parts of the state, around salt domes, or Louisiana was a part of very broad studies of the United States or North America. This study's data set includes approximately 20,600 Bottom Hole Temperatures (BHT) gathered from examination of approximately 12,300 geophysical logs of mainly oil and gas wells with a few water wells in addition.

Geothermal gradient varies throughout Louisiana both areally and with depth, and appears to be influenced by major structural features. For example, parishes that lie above the Sabine uplift have higher than average geothermal gradients. In general, for northern parishes it appears that only a single gradient is observed, but in southern parishes there are two gradients. For southern parishes geothermal gradient is approximately 1oF/100 ft from the surface to approximately 10,000 feet but below that depth it is significantly greater. The kink-point depth between lower and higher gradient appears to increase southwards across the southern parishes from about 10,000 ft below the surface in Acadia Parish to more than 16,000 ft below the surface in St. Mary and Terrebonne Parishes. The kink-point depth appears to correlate directly with the top of the geopressed zone, and probably reflects the contrast in physical properties between the hydro pressured and geopressed zones.