GERT - THE MAGNETIC RESPONSE

Jerry Calhoun
Consulting Geologist
Midland, Texas

ABSTRACT

The Geochemical Evaluation Research Team (GERT) project studied 13 different geochemical exploration methods in the Permian Basin. Three of these techniques involved magnetic characteristics of the fourteen wildcat areas in the project. The standard magnetic method was done by Geochemical Exploration Services of Dallas, TX, in search of the short wavelength, near surface response of authigenic magnetic minerals.

The residual magnetic method uses the GES data and applies a trend surface residual program to remove basement effects and emphasize the near surface, microseepage anomalies. Rigorously applied, this method can differentiate discovery wells from dryhole wildcats up to 81% of the time. Magnetic susceptibility of drill cuttings is a technique which identifies the actual presence of magnetic materials in near surface cuttings. The minerals identified as being responsible for the magnetic anomaly associated with microseepage are greigite, maghemite, and pyrrhotite. Robert Foote directed this effort in GERT. Unfortunately, too few of the operators remembered to catch the shallow samples to permit statistical analysis.

This paper emphasizes a sequential application of various geochemical methods prior to lease acquisition and seismic methods. A 1000 acre prospect can be analyzed with three methods measuring three separate chemical and physical parameters for no more than $7000. This reduces the wildcat risk prior to making the much larger investments such as seismic data acquisition.

A more complete report of GERT results was published in the May 13, 1991, Oil & Gas Journal. This three year study has lifted the unconventional methods of subsurface geochemical exploration from a hit-or-miss, poorly understood random application to a systematic discipline that can rightfully take it's place in the arsenal of tools the subsurface geologist can use to refine and substantiate his exploratory prospects.