High Resolution Airborne Magnetics Used to Describe Initial Prospect Leads in the Development of Oil and Gas Drilling Prospects in the Transition Zone of the Gulf Coast

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ABSTRACT

Light hydrocarbons escape from petroleum reservoirs and move in a vertical to near-vertical path to the surface. The accompanying geochemical processes create locally-anomalous rock properties in the overlying near-surface formations that are geophysically measurable. Depending on the chemical elements involved, the resulting alteration will either enrich or destroy the magnetic minerals present, changing their magnetic susceptibilities and creating, respectively, either positive or negative magnetic anomalies.

Because local, near-surface magnetic anomalies can also be caused by depositional processes or the structuring of the sediments, systematic follow-up is required to evaluate each magnetic lead. The goal is to first determine whether or not the magnetic anomaly signifies an alteration zone and, if so, to see if active hydrocarbon seepage is measurable.

We intend to demonstrate the ability of high resolution airborne magnetic survey to provide; (1) a more detailed picture of basement structure and topography; (2) more importantly, a perspective of the region's near-surface structural grain; and (3) specific targets that have the potential of being seep-related and truly worthy of the greater expense of seismic definition, leasing and drilling. Viable drilling prospects can be developed more quickly and cost-effectively by using this method.

Examples presented illustrate the contribution that high resolution magnetics can make in the exploration of the Gulf Coast Transition Zone.