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Surface Geochemical Analysis of Oil Potential in Selected Fields in the Michigan Basin Using Microbial Technology

Over 1000 soil samples were collected over two types of known oil fields in the Michigan Basin and analyzed for hydrocarbon signatures and oil potential using microbial technology. The majority of the sample were collected over a declining oil field, Vernon Field, in Central Michigan. It was thought that this field had potential for further recovery, either from bypassed oil or from untapped pockets (''attic oil''). The Vernon survey was extensive, covering all of the original field plus an apron extending 2-3 miles in all directions. The sampling was conducted on a 200-meter grid where possible and 400-meters otherwise. The results failed to convincingly distinguish between the original field and the surrounding barren rock, except in one case where it appears a shallow gas field may be present. Some nominal geochemical highs in the original field suggest modest amounts of bypassed oil, which was confirmed on drilling. A further test of the field based on geology and subsurface alteration patterns is scheduled, but the surface geochemistry does not show a convincing anomaly and the prediction is that the well will encounter noncommercial hydrocarbons at best.

A similar but less extensive study (100-200 samples) was conducted over several of the well-known pinnacle reefs in the Northern Michigan Trend. Good to excellent microbial anomalies were detected and mapped. One of these prompted a re-evaluation of the seismic data that culminated in moving the target to coincide with the geochemical anomaly. Unfortunately, new seismic on this prospect failed to show sufficient reef relief and the prospect was not drilled. A third target is being investigated in the Williston Basin which shows very high geochemical anomalies but is not yet complete. However the values obtained are so high relative to the Michigan work that they merit mention. Further field work is scheduled on this prospect.