

## Hydrocarbon Microseepage Evaluations from 1994 to 2003 of the Ames Hole Impact Structure, Oklahoma, USA

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**Daniel Hitzman**<sup>1</sup>, Brooks Rountree<sup>2</sup>, and Dietmar Schumacher<sup>1</sup>. (1) Geo-Microbial Technologies, Inc, P.O. Box 132, Ochelata, OK 74051, phone: 918-535-2281, fax: 918-535-2564, dan@gmtgeochem.com, (2) Geo-Microbial Technologies, Inc, Ochelata, OK 74051

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The Early Ordovician meteorite-impact crater known as the "Ames Hole" is located in Major County in northwest Oklahoma, USA and occupies an approximately 32 km<sup>2</sup> surface low. The circular structure of the crater controls numerous Silurian-Devonian reservoirs. In 1990, the no. 1-20 Gregory well, penetrated the deeper impact zone within the rebound structure and discovered more than 200 feet of brecciated granite with prolific oil and gas reserves, perhaps the most productive oil well from a single pay zone in Oklahoma.

In 1994 and 1995, 303 soil samples were collected along 30 miles (48 km) of east-west section roads for a reconnaissance hydrocarbon microseepage evaluation of the impact crater's outer and inner rim structural features as well as the more recent impact zone wells. The microseepage results highlighted the Gregory well location, other areas evaluated by deep wells, and new areas untested with deeper drilling. The hydrocarbon microseepage technique implemented was the Microbial Oil Survey Technique (MOST), developed by Phillips Petroleum Company. Over 40 years of world-wide MOST surveys reveal selective soil microorganisms living in dynamic equilibrium with hydrocarbon microseepage environments are accurate and effective indicators of petroleum accumulations at depth.

In 2003, 313 additional MOST samples were collected along 30 miles (48 km) of intersecting north-south roads. This follow-up survey evaluated previous microseepage signatures and looked for new exploration targets. In addition to MOST microseepage signatures, supplemental Sorbed Soil Gas (SSG) tests were completed to measure the hydrocarbon characterization of the Ames Hole reservoirs.

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