

real time multiplies the stacking rate by more than 10 if the Mini-Sosie method is compared to an ordinary impulse-by-impulse stacking method such as weight dropping. The method resists moderate external noise well and the source can be used almost everywhere, and is particularly useful in populated areas.

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Integration of Airborne Magnetic and Gamma-Ray Spectrometer Data for Uranium Exploration in Eastern Appalachians

Airborne gamma radiation surveys are very useful for surface geologic mapping, and aeromagnetic surveys are equally useful for basement geologic mapping. As the essence of airborne uranium exploration is the detection of the surface expression of a fundamentally subsurface phenomenon, the problem becomes one of resolving the vagaries of uranium migration in the subsurface or of "bridging the gap" between the basement and the surface. In the data-acquisition phase of the airborne survey, the three essentials are large crystal volume gamma-ray detectors, closely spaced magnetic data (recording interval of approximately every 100 ft or 30 m of ground distance traversed, or 0.5 sec), and digital data recording. With such a magnetic data-acquisition interval, small anomalies from sources within the section, such as mineralization in fault planes, erosional unconformities, etc. can be correlated upward with radiometric anomalies and downward with fundamental basement and structural anomalies.

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Geology and Production Potential of Monteagle Limestone (Upper Mississippian) of Morgan County, Tennessee

Monteagle (Upper Mississippian) gas production in Morgan County, Tennessee, is stratigraphically controlled by several porous limestone zones. These zones may be partially controlled by regional structure, as pencontemporaneous minor faulting may have caused localized shoaling during deposition with a resultant oolitic limestone development. In addition, after lithification, minor structural deformation appears to have created secondary fracture permeability which enhances production.

Detailed stratigraphic mapping of the oolitic zones offers the best exploration guide. Mapping may be coupled with a regional tectonic evaluation to derive joint and fracture directions. Operators would benefit from obtaining accurate subsurface material in drilling productive zones, followed by detailed examination of cuttings.

Most common completion techniques in these fields include application of raw acids and/or explosives, both of which leave undesirable completions with rapid decline of deliverability. Use of delayed acid treatment is strongly indicated as well as hydraulic fracturing with sand-propping where economically justified. The Monteagle gas, despite its under-pressure characteristics,

presents a good economic potential for small operators who follow basic geologic concepts and use modern completion techniques.

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Petroleum Geology of Whirlpool Member (Silurian) of McConnelsville Field, Morgan County, Ohio

With the drilling of the 1 Forrest Knox, Meigsville Township, Morgan County, Ohio, by O'Neal Productions, Inc., in July 1977, a new pay in the McConnelsville field was opened when production was obtained from the Whirlpool Member of the basal Silurian Albion Group. More than 20 wells have been drilled in this pool and sufficient production has been obtained to extrapolate production curves. These curve extensions indicate that an average well should produce 58,000 bbl of oil on 40-acre spacing over a 10-year life. This is believed to be a more accurate representation of expectations than the 9,000 bbl indicated by volumetric calculations, or the 120,000 bbl indicated by a previous paper on the Blue Rock field in Muskingum County, Ohio.

The Whirlpool Member is a very fine to medium-grained, white to light-gray sandstone that was deposited in meandering channels on a broad delta plain of the Ordovician Queenston Formation. Three deposition zones are present in the Whirlpool, with varying oil and water saturations in each zone. Production is directly related to log porosities indicated by correlation of compensated density readings. Such porosity trends are difficult to project.

Drilling has been restricted to the rotary method with air rotaries encountering fewer difficulties than mud rotaries. Completion techniques have been confined to fracture treatments using a relatively slow injection rate and appear to be quite successful in confining the treatment to the formation.

The relation of this pool to the older Blue Rock pool and to the scattered few test wells indicates that a substantial area of untested Whirlpool awaits exploration and should reward the explorer.

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Fossil Fluids in Post-Silurian Rocks of Appalachian Basin

More than 90% of the fluids in post-Silurian rocks of the Appalachian basin have been reported from three states—New York, Pennsylvania, and West Virginia. American Petroleum Institute estimates show 10,415 million bbl of oil in place with 2,124 million bbl as the total ultimate recoverable using known methods of production. The American Gas Association estimates 28, 039 Bcf as the total ultimate recoverable amount of natural gas. These figures are low by a multiple of 2 to 10. Connate water is present only in some of these rocks; many are nearly, or entirely, devoid of liquid water. All of the oil and gas and most of the salt water is considered to be of Paleozoic age.