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# Association Round Table

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## AAPG EASTERN SECTION MEETING

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### ABSTRACTS

ASHTON, KENNETH C., CARL J. SMITH, and MIKE E. HOHN,  
West Virginia Geol. and Econ. Survey, Morgantown, WV

#### Ash Fusion Study of West Virginia Coals

As more industries and utilities convert to coal, ash fusion information becomes more important for boiler design (waste disposal systems). For example, burning a low fusion temperature coal can cause slagging—the buildup of molten ash on boiler waterwall tubes. Not only is boiler efficiency lowered, but downtime is also increased.

Recently, potential buyers of West Virginia coal have inquired frequently about ash fusion. However, the amount of information in the West Virginia Geological and Economic Survey's data base is limited to data from about 800 samples, 50% of which were collected in five counties. Thus, the survey is conducting a study of ash fusion temperatures for the state's coals, to increase available data and its geographic coverage.

A Leco AF-500 automated ash fusion analyzer was used in this study, which addresses: (1) reliability of results from an automated analyzer, (2) comparison of automated data with conventional data, (3) techniques of sample preparation, high-temperature ashing, and cone preparation, (4) ash-fusion trends in the state, and (5) research developments.

The research sought to develop for West Virginia coal a statistical correlation model relating ash-elemental data with fusion data, and to investigate the relationship between ash color and fusion temperature. (Light-colored ashes generally have higher fusion temperatures than darker ashes.)

The ash fusion project adds vital information to our computer data base. With this addition, the survey can offer a more complete, unbiased source of information about West Virginia seams to prospective buyers of West Virginia coal.

BARTLETT, CHARLES S., JR., Bartlett Energy Exploration, Inc.,  
Abingdon, VA

#### Trenton Limestone Fracture Reservoirs in Lee County, Southwestern Virginia

The search for the elusive fracture-type oil and gas reservoirs in southwestern Virginia's Lee County has continued intermittently since the opening of the Rose Hill oil field in 1942. Tests as early as 1910 were based on surface oil seeps. Charles Butts, a pioneer Appalachian geologist, recognized several windows eroded through the Pine Mountain thrust plate. Three Lee County oil fields were developed within or near these windows, but a recent increase in drilling has expanded onto the overthrust sheet.

The Ben Hur oil field, 16 mi (26 km) northeast of the Rose Hill pool, was opened in 1963. Since 1981, a burst of exploration has enlarged these two fields and added one new oil field and the first commercial gas well.

Production is obtained principally from a nonporous biomicrite with secondary fracturing, which is locally intense. From 1943 to 1980, 42 wells recorded production of nearly 123,000 bbl or about 3,000 bbl/well. Since 1981, increased oil prices created heightened interest in Lee County drilling, which resulted in production of 128,112 bbl of oil in a 3-yr span, more than during the previous 39 yr.

The Trenton Limestone is generally 400-500 ft (122-152 m) thick, and production has been obtained at depths between 1,300 and 2,500 ft (396

and 762 m). The fracture identification log run by Schlumberger has proven quite useful, but oil shows are also readily noted while air drilling. Many wells respond to an acid-frac stimulation. Exploration for the more highly fractured reservoir areas is presently frustrating, and logical geologic concepts have not replaced plain good luck.

BASILONE, TIM, and THOMAS ANDERSON, Univ. Pittsburgh,  
Pittsburgh, PA, and ROBERT C. BURRUSS, Gulf Oil Corp., Houston,  
TX

#### Origin and Implications of Fluid Inclusions from Filled Fractures, Oriskany Sandstone, Allegheny Plateau, Pennsylvania

Two cores from the Lower Devonian Oriskany Sandstone underlying the Allegheny Plateau in south-central Somerset County, Pennsylvania, contain fractures that may either be filled with epigenetic minerals or unfilled. The 1 Sipe core, taken from an unproductive well drilled on the crest of an anticlinal structure, is characterized by numerous discontinuous vertical fractures. The 1 Romesburg core, taken from a productive well drilled on the flank of an anticlinal structure, contains numerous fractures that lie parallel with bedding planes. The walls of these fractures consist of smooth slickensided surfaces.

Quartz and ferroan-calcite crystals filling fractures contain numerous hydrocarbon-bearing fluid inclusions. The distribution of these fluid inclusions within most minerals allowed a determination to be made regarding the relative times of migration of fluid hydrocarbon phases in the subsurface with respect to the paragenetic sequence of mineralization events.

Analysis of fluid inclusions indicates that fractures were opened at 22,000 ft (6,700 m) and remained open throughout an extended period of uplift. Furthermore, inclusions contain hydrocarbon-rich fluids that are comparable to reservoir hydrocarbons in the nearby Shamrock field. This relationship implies that hydrocarbons that currently exist in reservoirs were conducted along fractures that were once open.

Fractures crosscut diagenetic features, indicating that diagenesis, for the most part, preceded fracture events. Although they differ in origin and orientation, fractures characterizing Oriskany strata were healed by a consistent sequence of epigenetic minerals.

BEINKAFNER, KATHERINE J., Sohio Petroleum Co., San Francisco,  
CA

#### Mapping Seismic Reflectors in Southern New York: Compensation for Velocity Anomalies in Glacial Overburden

In the process of incorporating seismic coverage and well data into a single mappable interpretation, many seismic time sections were found to display data with improper static corrections for near-surface velocity anomalies. These anomalies originate in the glacial overburden, which exhibits sudden and sizable variations in thickness and seismicity through much of the Allegheny Plateau of southern New York. An expedient method to compensate for these variations was sought to use the seismic analog data.

Along the southern tier of New York, detachment structures have been