KAUFFMAN, MARVIN E., Franklin and Marshall College, Lancaster, PA

Antietam Sandstone: Lower Cambrian Analog to Petroleum-Bearing Stringer Sands or Barrier Islands

The Lower Cambrian Antietam Sandstone crops out in southeastern Pennsylvania as many elongate, narrow ridges, commonly surrounded by lowlands thought to consist of shale and/or limestone. Most interpretations for this pattern have relied on complicated faulting to terminate the ridges. Mapping by the writer and his students suggests a simpler explanation: namely, this discontinuous series of sandstone ridges is an exhumed line of barrier islands that stood in front of the Early Cambrian continent. Barrier sands are surrounded by argillaceous units (the Harpers Phyllite) and calcareous marine units (the Vintage Dolomite), standing in front of sandy shoreline deposits (the Chickies Formation). Detailed stratigraphic studies, combined with petrologic analyses of related formations, grain studies, and comparisons of sedimentary features show the Antietam Sandstone to be very similar to such beaches as Fire Island, New York; Long Beach Island, New Jersey; and Pea Island, North Carolina. Very close similarities were found between the modern setting and the Early Cambrian formations, lending credence to this model for the Antietam Sandstone ridges. This porous sandstone, surrounded by less permeable lithologies, may be a potential reservoir in regions where metamorphism has not precluded the existence of hydrocarbons.

KULPECZ, ALEXANDER A., Shell Oil Co., New Orleans, LA

Geologic and Commercial Evaluation of Heavy Oil Prospect in Maverick Basin, Texas

In December 1979, a 6,500 acre (2,631 ha.) farm-in prospect in the Maverick basin in Texas was offered to Shell as a potential field for heavy oil production using steam injection. Preliminary economic models from a limited data base were insufficient to evaluate this potentially profitable prospect. A test well was drilled and 100 ft (30 m) of the shallow Upper Cretaceous San Miguel sand (at about 2,000 ft or 610 m) was conventionally cored to obtain accurate data.

From the core description, thin-section, and grain-size analysis, the San Miguel basal sand is interpreted as a barrier-island deposit with the upper zone reworked by a transgressive marine cycle. Petrographic analysis indicated early calcite cementation in a complex pattern in the gross sand interval. Natural fracturing is present in the reservoir. The heavy oil is highly viscous with an extremely low API gravity. The relation of heavy oil to grain morphology was shown by SEM photographs.

The log and core data indicated 45 net ft (14 m) of oil sand. However, oil saturations and gross sand quality were inadequate to meet minimum requirements for a profitable project.

KVENVOLDEN, KEITH A., U.S. Geol. Survey, Menlo Park, CA, and WILLIAM P. DILLON, U.S. Geol. Survey, Woods Hole, MA

Natural-Gas Hydrates of Blake Ridge Region, Atlantic Continental Margin

A strong acoustic reflection that parallels the sea floor has been observed in seismic profiles collected over the Blake Ridge region, off the southeastern United States. This anomalous reflection occurs at a subbottom depth of 400 to 700 m in water depths of 750 to 3,750 m and has been mapped over an area of at least 80,000 km^2. The reflection probably is due to the contrast between an upper high-velocity zone of sediment cemented by gas hydrates and an underlying low-velocity zone that does not contain gas hydrates.

Coring by the Deep Sea Drilling Project (DSDP) has shown that gas hydrates are present in this region. During DSDP Leg 11, high concentrations of gas were observed; gas was composed mainly of methane of light carbon isotopic composition (< -70 per mil relative to PDB standard) accompanied by minor amounts of heavier hydrocarbons and carbon dioxide. DSDP Leg 76 confirmed that high concentrations of methane are present in sediment from this region. Conclusive evidence for gas hydrates was obtained when a vigorously outgassing sediment sample with a matlike layer of white crystals was recovered. The volume of gas released from this sample was about 20 times the volume of pore fluid, a result clearly indicating gas hydrate. Results obtained by using a pressure core barrel also indicated that gas hydrate is present. The molecular composition of the hydrocarbon gases and the isotopic composition of the methane suggest that the methane is of biologic origin. This methane, if trapped beneath the gas hydrate in reservoir rocks, could represent a significant resource.

LAINE, EDWARD P., JULIE C. FISHER, JANIS K. TUTTLE, et al, Univ. of Rhode Island, Narragansett, RI

Anomalous Sedimentary Features on Floor of Northern Hatteras Abyssal Plain

Analysis of approximately 700 km of high-resolution 3.5-kHz seismic profiles taken aboard the R/V *Endeavor* during the summer of 1980 indicates several distinct and sometimes puzzling features on the floor of the northern Hatteras Abyssal Plain. The basic pattern of echo character is perpendicular to rather than parallel with the axis of the plain, extending in bands across the plain almost to the Bermuda Rise. This banding may be the result of very low-relief fans extending across the basin from entry points at the Hatteras, Wilmington, and perhaps Hudson Canyon mouths. A series of terracelike features slopes gently seaward to form the western boundary between the abyssal plain and lower continental rise hills. Each terrace has a length of 5 to 10 km and an approximate relief of 5 m at its seaward boundary. Whether this 50-km wide boundary zone has been formed by boundary currents, intraformational faulting, or fan development is not clear. Distinct lensoidal deposits 200 to 500 m long and less than 5 m thick are sparsely distributed west of the Hatteras Canyon mouth. These acoustically transparent lenses lie in shallow channels and closely resemble debris-flow deposits; however, their small size and sparse distribution do not suggest that they are laterally continuous. These anomalous sedimentary features will be more intensively studied during the summer of 1981.

LAMBERT, DOUGLAS N., and RICHARD H. BENNETT, NOAA, Miami, FL

Submersible-Mounted In-Situ Geotechnical Instrumentation

New miniaturized in-situ geotechnical instruments have been developed and field tested with the DSRV *Alvin* in various sedimentary features associated with mass movements of sediments on the U.S. East Coast slope and rise within the Wilmington geotechnical corridor. The instruments include a cone penetrometer, resistivity probe, miniature piezometer, and an inclinometer.