STEELMAN, RUTH E., Univ. South Carolina, Columbia, SC; VICTOR V. CAVAROC, North Carolina State Univ., Raleigh, NC; ALPHONSO R. GUIDICI, Yacimientos Petroliferos Fiscales, Buenos Aires, Argentina

Productive Continental Block-Fault Deposits of a Mesozoic Back-Arc Basin

Continental sediments filling major extensional block-faulted basins in the rock record traditionally are ascribed to plate margin rifting. The Triassic Cuyo basin of central Argentina is such a continental sedimentary basin, which contains over 3,600 m of interbedded fluvial, lacustrine, and volcanic deposits and which produces about 98,000 BOPD. It, however, formed within a back-arc tectonic setting as a reentrant into the Pampean craton prior to the onset of compressional deformation. The southern half of this basin (about 9,000 km^2) was studied using logs and cutting descriptions from 101 exploratory wells.

The basin began as a series of subparallel fault blocks and accumulated at least 2,750 m of fining-upward detritus in its first cycle of sedimentation. Initial deposits were oxidized lithic conglomeratic units confined by elongated grabens. As faulting waned, high-gradient fluvial sandstones became prevalent (41%), derived primarily from reworking of interbedded felsic tuffs (29%). The end of tensional faulting is marked by widespread bituminous lacustrine shales that form the source beds for oil production. Broad basin subsidence, probably associated with lithospheric cooling, initiated a second episode of basin sedimentation in which tuffs and sediments containing fluvial sandstones (48%) markedly overlap the original basin boundaries. Sandy lag conglomerates of an intermontane braided-stream system cap the interval. These deposits were temporarily interrupted by valley basalt flows (Upper Jurassic-Lower Cretaceous), which are similar in composition to diabase dikes of the underlying strata.

SULLIVAN, E. M., and D. A. TEXTORIS, Univ. North Carolina, Chapel Hill, NC

Petrology of Upper Mississippian Denmar Formation, Greenbrier Group, East-Central West Virginia

The Denmar Formation of Randolph County is a package of interbedded marine carbonates and siliciclastics deposited on a broad subsiding carbonate platform. Seven major microfacies are recognized: terrigenous siltstone, dolomitized micrite, pelmicrite, biopelmicrite, quartzose pelmicrite, oosparite, and oomicrite. These microfacies characterize three major paleoenvironments: supratidal, intertidal, and shallow subtidal. Four major diagenetic realms are noted: the low supratidal flat containing evaporites and dolomite; the meteoric zone containing blocky calcite spar; the shallow marine phreatic zone with marine cement and micritized fossil fragments; and the burial zone containing mature stylolites.

The Denmar Formation represents a sequence of alternating low-energy, shallowing-upward pelmicrite-mudstone and higher energy, shallowing-upward oosparite-grainstone shelf cycles. The pelmicrite-mudstone cycles are mainly composed of intertidal and supratidal sediment. The oosparite-grainstone cycles are mainly composed of low and higher energy subtidal sediments.

Diagenesis occurred in both the marine and meteoric zones. Paleoenvironmental reconstruction of east-central West Virginia during deposition of the Denmar is attempted.

SWEENEY, JOE, West Virginia Geol. and Economic Survey, Morgantown, WV

Deformation Domains Around Burning Springs Anticline of Central Appalachians

Under a contract with the Gas Research Institute, the West Virginia Geological and Economic Survey has begun a two-year project to determine the relationship between Devonian shale production and certain geologic and technical factors, such as geologic structure. Six counties in western West Virginia were selected for study. The north-south-trending Burning Springs anticline bisects those counties and marks the western edge of the Salina salt basin. Two horizons were selected for structural datums—the base of the Huron Shale Member of the Ohio Shale (Upper Devonian), and the base of the Mississippian Greenbrier Group. Point-to-point contouring methods, rather than generalization, revealed deformation containing differing structural styles (domains) throughout the study area, and those domains may have a relationship to the Salina salt basin (Late Silurian).

Structural cross sections reveal that the southern end of the Burning Springs anticline is a gentle fold amplified by thrust faults, probably ramping up from a sole fault in the Salina salt beds. Mississippian, Pennsylvanian, and Permian strata are draped over those thrusts. Lineaments, as defined by structure contours, mark the boundaries of subthrust sheets along the Burning Springs anticline. Orientations of those structural lineaments coincide with orientations of mapped surface lineaments.

Oil production from the Devonian shales is confined to the eastern flank of the Burning Springs anticline in areas overlying the Salina salt basin, and may be related to fracturing caused by intense deformation, in contrast to less intense deformation of rocks west of the salt basin.

TALKIEWICZ, JOSEPH M., State Univ. New York at Buffalo, Amherst, NY, and GARY G. LASH, State Univ. New York at Fredonia, Fredonia, NY

Petrographic Trend-Surface Analysis of Martinsburg Sandstones of Eastern Pennsylvania and New Jersey: Significance and Implications

The Martinsburg Formation (Middle-Upper Ordovician) of eastern Pennsylvania and New Jersey, part of a flysch belt that extends from Newfoundland to Alabama, records Taconic orogenic events and foreland basin sedimentation in the central Appalachians. Facies analysis of the Martinsburg in eastern Pennsylvania and western New Jersey suggests that it was derived predominantly from longitudinal sources and did not accumulate as a typical submarine fan, as commonly believed. Petrographic trend-surface analysis of 45 samples of Martinsburg sandstone from Delaware Gap, New Jersey, to southeastern New York indicates: (1) an increase in total quartz content to the northeast; (2) a decrease in lithic fragment content to the northeast; and (3) a decrease in total feldspar content to the northeast. These results are consistent with overall compositional trends within the Martinsburg belt from southwest Virginia to New York, described in previous studies, and support a dominant source terrane to the southwest. Significantly, trend-surface analysis points out a lack of strike-parallel concentrations of specific framework components, thereby reinforcing a longitudinal dispersal system. Consideration of the Martinsburg sandstone in terms of published QFL diagrams suggests derivation from a recycled orogene source characterized by uplifted supracrustal sedimentary and lesser plutonic/low-grade metamorphic rocks, and points out the lack of a major volcanic input. This is further substantiated by preliminary geochemical examination of these sandstones, which supports sandstone accumulation at a tectonically active but nonvolcanic margin, although volcanic arcs may have existed outboard (southeast) of the Martinsburg source terrane.

TAYLOR, G. KENDALL, and ROBERT RESSETAR, Univ. South Carolina, Columbia, SC

Depositional and Structural Histories of Richmond and Taylorsville Triassic Rift Basins

The Richmond and Taylorsville basins of Virginia display similar structural and sedimentological histories, which differ somewhat from those of other eastern North American rift basins. Both basins formed during the middle Carnian in response to the initial opening of the North Atlantic Ocean. Both are westward tilted half grabens whose border faults share a reactivated Paleozoic basement thrust (the Hylas zone). A dipmeter log from the Bailey 1 well (Richmond basin) shows that bedding dips toward the border fault and increases with depth. These relationships are interpreted to reflect syndepositional rotation and tilting of the basin above a listric normal fault.

Unlike the red beds typical of other eastern North American rift basins, sediments of the Richmond and Taylorsville basins are mostly unoxidized gray sandstones and siltstones. The sediments of both basins can be divided into three facies associations. The lowest is a poorly sorted, coarse-grained, lithic arkose rapidly deposited in alluvial fans and braided streams. This was succeeded by sand, silt, and mud of a lower