Kansas Geological Survey, Current Research in Earth Sciences, Bulletin 241, part 2

Next Page--Introduction

Distribution of the Bandera Shale of the Marmaton Group, Middle Pennsylvanian of Southeastern Kansas

Robert L. Brownfield, *Department of Geology, University of Iowa, Iowa City, IA 52242-1379*

Robert L. Brenner, *Department of Geology, University of Iowa, Iowa City, IA 52242-1379*

John P. Pope, *Department of Geology, University of Iowa, Iowa City, IA 52242-1379*

- Click here for summary information or for a PDF (Portable Document Format) file.

ABSTRACT

In southeastern Kansas, the Middle Pennsylvanian (Desmoinesian) Bandera Shale consists of sandstone, shale, limestone, and coal deposited between two carbonate formations, the underlying Pawnee Limestone and the overlying Altamont Limestone. Isopach maps and cross sections indicate that the Bandera Shale thickens southeastward towards the Oklahoma and Missouri borders. Analysis of gamma-ray-log signatures, augmented by neutron-log signatures, indicates that the Bandera Shale is rich in mudstone, with sandstones limited to intervals ranging from 10 ft to 30 ft (3-9.1 m) in thickness. Comparisons with previously studied cored and logged siliciclastic portions of overlying Missourian lithologies suggest that the Bandera Shale consists of various proportions of sandstone, siltstone, clay-rich shale, and calcite-cemented sandstone.

Exposures of the Bandera Shale in Bourbon County, Kansas, consist of interbedded shale and calcite-cemented, fine-grained sandstone. Sandstone beds, ranging from 3 cm to 20 cm (1.2-7.9 in) in thickness, are, in places, rhythmically laminated with organic-rich and organic-poor lamina forming 2-mm (0.8-in)-thick couplets. Many sandstone bedding surfaces in the lower and middle portion of the Bandera Shale are bioturbated with horizontal feeding trails and some vertical burrows that suggest marine environments. Thicker sandstone units are either trough cross-bedded, with sets up to 1.5 m (4.9 ft) thick, or amalgamated ripple cross-laminated and flaser-laminated.

Outcrop observations coupled with subsurface analysis indicated that Bandera Shale in southeastern Kansas was deposited as a siliciclastic complex that prograded westward during a sea-level lowstand. Siliciclastic sediments may have been deposited in a clastic wedge or deltaic complex, but sedimentary characteristics observed in outcrops record marine influence at least along the margins of the complex. Rhythmic stratification within sandstone beds that are interbedded with shale resemble tidal features described elsewhere in the Pennsylvanian of North America and suggest that embayments were present where tidal cells were amplified along a morphologically irregular shoreline. Bioturbated sandstone units, interbedded with clay shale, record high-energy events that influenced sand distribution.

Next Page--Introduction

Kansas Geological Survey
Web version June 24, 1998
http://www.kgs.ku.edu/Current/1998/brownfield/brownfield1.html
email:lbrosius@kgs.ku.edu