UPPER MISSISSIPPIAN DELTAS IN THE BLACK WARRIOR BASIN OF MISSISSIPPI AND ALABAMA

Matthew C. Broussard[1] and Arthur W. Cleaves[2]

ABSTRACT

Terrigenous clastic and carbonate depositional systems comprising the lower two-thirds of the Chester Series were laid down on the shallow northern shelf of the Black Warrior foreland basin. The evaluated section involves the rock units between the Tuscumbia Limestone and the "Millerella" limestone tongue of the Bangor Formation. Three significant cycles of deltaic progradation have been identified in northeastern Mississippi and northern Alabama through data gathered from 550 oil well logs and 10 measured sections. Two deltaic depocenters, a carbonate shelf complex, and a shallow basin carbonaceous shale unit are the primary depositional systems noted in the area.

Three genetic intervals have been identified on the basis of thin marine transgressive carbonate units. The lowest (Lewis) interval involves a high-constructive lobate delta system whose axes of maximum sandstone thickness extend southeastward from Lee and Itawamba Counties, Mississippi, as far as Tuscaloosa County, Alabama. Maximum net sandstone thicknesses for individual lobes average 60 ft. The middle interval includes a western Evans High-Destructive Wave-Dominated Delta Complex centered in Lee and Itawamba Counties, Mississippi, and a more easterly Hartselle High-Destructive Wave-Dominated Delta System in northwestern Alabama. The Hartselle Delta System attains net sandstone thicknesses greater than 160 ft along a northwest-southeast trend that extends almost to Birmingham. Evans delta lobe maxima average about half that thickness. The upper interval is dominated by the thick, multistoried Muldon High-Constructive Elongate Delta System (Rea through Carter sandstone units), centered in Monroe County, Mississippi. Northeastward, and laterally equivalent to the Muldon Delta, is the Bangor carbonate shelf.

The Lewis, Evans, and Muldon units represent relatively thin, cratonic deltas whose sandstone provenance is to the north-northwest of the Black Warrior basin, perhaps a southeastern Missouri source area. Hartselle terrigenous clastic rocks were transported from the northeast and southeast and likely have an Appalachian source.

---

[1]Amoco Production Company, New Orleans, Louisiana 70151
[2]Department of Geology and Geological Engineering, The University of Mississippi, University, Mississippi 38677